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ORLD AIR TRANSPORTATION

JUNE, 1961

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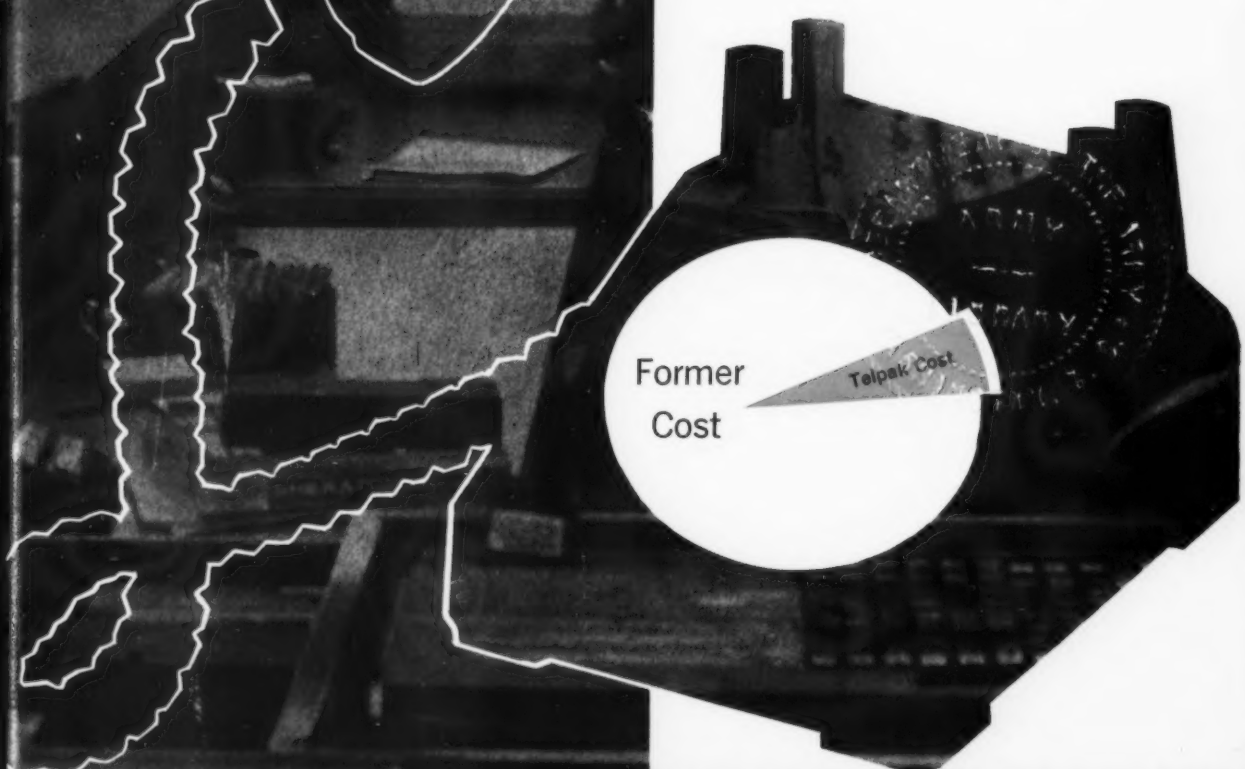
SERIAL RECORD

TELPAK: Reservations Miracle

New AT&T low-cost phone service trims rates to a fraction of past level. Although biggest impact may come in reservations, airline operations and maintenance will benefit, too . . .

Page 21



For a 14" x 10" lithographic print, suitable for framing, write Aviation Division . . . request Historical Series #5.

March, 1917 . . . René Fonck in a Caudron G. IV bomber engages Albatros single-seaters.

Early War Birds— THE CAUDRON G.IV

This French, twin-engine two-seater was used for bombing and reconnaissance in World War I during 1916 and part of 1917. When powered with 80-horsepower rotary engines, the G. IV had a top speed of about 80 m.p.h., an initial rate of climb of 380 feet per minute, and a maximum endurance of 4 hours. It was normally armed with a single machine gun, mounted ahead of the front cockpit and fired by the observer. Featuring warp-control wings instead of ailerons, slow and awkward, the G. IV seemed scarcely adequate for operational flying. It was enough of a plane, however, to start the French Ace, René Fonck, on his amazing combat career.

The opportunity occurred on March 17, 1917, after Fonck had spent two years as a bomber-reconnaissance pilot. Ever since his Caudron had been armed with a machine gun some nine months before, Fonck set himself to the task of downing an enemy plane. Although he had been involved in some indecisive engagements and achieved one victory of sorts when a two-seater surrendered, uncompromised success still eluded him. On this day, Fonck was not to be denied. He was flying with another G. IV when five Albatros single-seaters attacked. In spite of the odds, Fonck and the other G. IV pilot accepted combat. In the ensuing struggle, Fonck skillfully managed to evade the attackers . . . maneuvering his ungainly craft for a telling shot. His observer fired, and an Albatros went down. The other Caudron was disabled and crash landed inside French lines.

Shortly after, Fonck was transferred to a "fighter" group, the famous "Cigognes" or "Storks", where he was soon noted for his expert marksmanship and skillful combat tactics. At the War's end, he had 75 accredited victories and was the leading Allied ace . . . twice credited with shooting down six enemy planes in one day.

PHILLIPS 66

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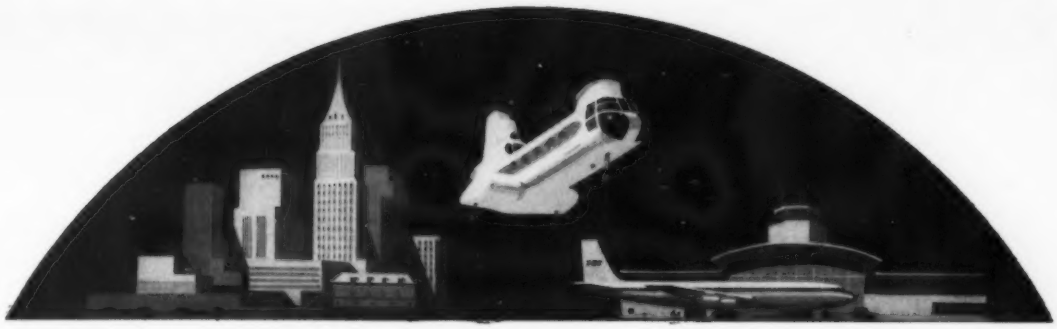

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JUNE, 1961—VOL. 25, NO. 1

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THIS MONTH'S COVER—The biggest development to hit the airline scene in years is neither a new aircraft nor a new invention. It's AT&T's TELPAK phone service, a low-rate packaged system which is revolutionizing airline concepts of reservations. For complete details, see Eric Bramley's analysis of what it is, how it works and its impact on the airlines . . . Page 21.

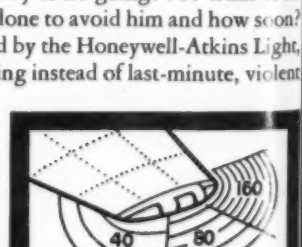
20,200 copies this issue

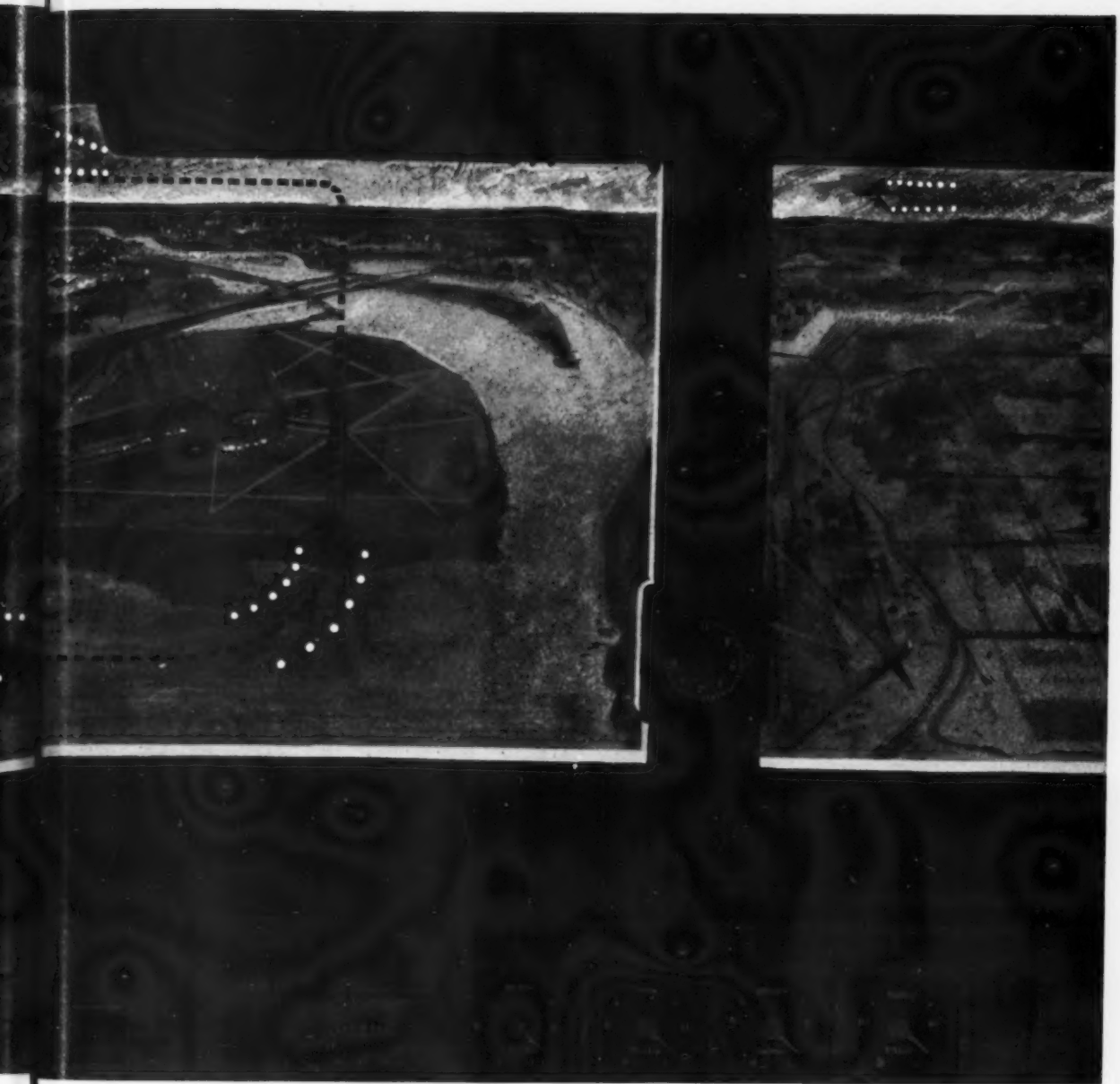
Now... Mid-air collision danger

"Flight 507 . . . You are cleared to enter traffic for runway 36 . . . You are number four to land . . . Report on downwind."

This cockpit view shows a busy airport traffic pattern made safe because the pilot can see all aircraft in traffic, their direction of flight, relative range, attitude and projected flight path. This, because all planes shown are equipped with the new Honeywell-Atkins Maximum Safety Light System.

CAB records show that over 80% of the mid-air collisions and near-collisions occur within the vicinity of airports. Modern high-speed aircraft must be equipped with bright enough lighting to be seen under daylight restricted visibility conditions as well as at twilight and night. The information seen by the pilot should tell him: Where is the other aircraft? . . . Which way is he going? . . . What is he doing? . . . What must be done to avoid him and how soon? This information, generated by the Honeywell-Atkins Light, promotes flight path planning instead of last-minute, violent evasive action. This high-intensity, xenon strobe lighting system flashes into the zone ahead at a rate of 160 flashes per minute, to the sides at 80 per minute and to the rear at 40 per minute.





can be drastically reduced!

The location of the lighting systems in the aircraft wingtips automatically provides attitude and ranging information. Existing lighting equipment need not be altered or removed, this lighting system is compatible with it. The Honeywell-Atkins Maximum Safety Light has been proven on numerous flight evaluations, is approved by the FAA and is now in service on many military, corporate and commercial aircraft. For more information, contact your local Honeywell representative, or write Honeywell, Aeronautical Division, 2600 Ridgway Road, Minneapolis 40, Minnesota. *Sales and service offices in principal cities throughout the world.*

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"One thousand per cent the first full year of operation and 2,000% by the end of the second year." That's how C. M. Belinn, Los Angeles Airways president, summarized the projected growth of this pioneer helicopter airline, readying now for delivery of its first Sikorsky S-61L's late this year. Operating a total of five S-61L's over expanded routes, LAA expects the 28-passenger turbocopters to reduce seat mile costs by one-half over its present piston-powered S-55's. The airline will also take full advantage of the Sikorsky turbocopter's roomy cargo areas to further expand its cargo-mail-express business, now handling over eight million pounds yearly. The Sikorsky S-61L, first helicopter ever designed from the start for use as an airliner, provides comfortable, quiet airliner-type cabins...twin-turbine reliability...all-weather flight capability. For complete cost and operating facts, call or write Sikorsky Aircraft. SIKORSKY AIRCRAFT Division of UNITED AIRCRAFT CORPORATION Stratford, Connecticut

"These turbocopters will enable us to increase traffic by 1,000%"

Pushed Too Far

IT WAS HEARTWARMING to read the blistering criticism which W. A. Patterson, president of United Air Lines, leveled recently at the City of Denver. Finally an airline executive got pushed just a little too far; finally an executive lowered the boom and he did so before the right kind of an audience—the Denver Chamber of Commerce.

What Denver has been proposing is a presumptuous precedent that spells only disaster. It is proposing that the airlines pay for the cost of running the airport while all the concession income (which is quite substantial at Denver) goes into a general fund. It proposes a $30 million surplus for a general fund without any commitment whatever that this money would be used for airport purposes. In short, Denver wants the carriers to stand all the costs while the city keeps all the non-carrier revenues for itself. A fine money-making venture if you can get it. A real field day for politicians.

If all airports followed the Denver plan of ignoring concession revenues in determining airline charges, there is no hope whatever ahead for mass transportation by air, for higher fares are the only alternative. Six years ago two per cent of United's overall expenses were for airport rentals, today they have risen to five per cent. United isn't protesting an increase of that order—it recognizes the added costs of jet requirements. But Denver has leaped into something brand new.

The irony is that Denver was the first city in the country to sell revenue bonds for the development of facilities on an airport. And it was a fine deal all around. It was a self-sufficient transaction without a penny of burden to the taxpayers. United even went so far when additional revenue bonds were sold to finance construction of a building for its use on the airfield that it insisted that property taxes be included in the rental even though these were not necessary on city-owned property.

Several years ago Denver rejected United's proposal for construction of a training school for stewardesses in that city. Now it is watching United's $16 million annual payroll there decrease. Somebody in Denver had better get smart and eliminate both politicos and consultants who have messed up what was once an ideal city-carrier relationship. Meantime, we think it was high time United's president cut loose with a blast—it was a good one.

An Old Frontiersman?

WE ARE TOTALLY FLABBERGASTED at the action of Defense Secretary McNamara in his last-minute undoing of all the good efforts of the past year to remove military-airline contracting from the bloody arena of cut-throat competition. This is hardly to be classed as exploring a "new Frontier", but rather an old one which should have been left to the history writers.

All seemed fine when the requests for proposals for next year's Logair and Quicktrans business were mailed by the Air Force. To qualify, an airline had to be one defined under the FAA Act of 1958: no Part 45 carriers who are outside the control of CAB; no "fast buck" operators. Following the Presidentially-approved courses of action set down by the outgoing administration, the military was starting down the right track.

But what happens? One of the Part 45 carriers shut out by the new policy hires itself a former assistant to the President in the Eisenhower Administration who calls on Secretary McNamara. Then one call from a Senator. That's all it takes and the bloody price war is on again, but it promises to be worse than ever. The number of bidders jumps from 34 to 69. CAB, in Pontius Pilate fashion, washes its hands of the matter. That much-needed emphasis toward more modern equipment goes out the window. Again we ask: A new frontier?

Good Start

AT LONG LAST a major trunk carrier is experimenting with low-fare no-reservation high-density commuter service. Eastern's "air shuttle" between Washington-New York-Boston has gotten off to a fast start. The break-even is lower than you'd think. Well worth watching because if it works, more such service is in the works.

Irreverencies

FAA ADMINISTRATOR Najeeb Halaby has to rely on his facile, witty mind to keep audiences amused during this period of living off promissory notes, and has come up with a current Washington quotation which he delights in passing on in his speeches. It runs something like this: "Our Father Who Art In Washington, Halaby Thy Name."

We think this can be extended a little bit, as follows:

Quesada, some say he went to heaven
Halaby thy name
Woe be unto Project Horizon
If it's just some more of the same

Shake well before using.

Wayne W. Parrish

JT3D

A progression of turbofan power.

JT3D designates a whole group of twin-spool, turbofan engines designed and built by Pratt & Whitney Aircraft, as shown in the power growth chart below. These turbofans are the offspring of the record-making J57 jet engine. The turbofan uses approximately 15 per cent less fuel at comparable cruising thrust than the conventional jet. Pratt & Whitney Aircraft's JT3D family provides a broad range of available power—17,000 to 24,000 pounds of take-off thrust, or more. This thrust increase can be accomplished with little effect on the radial size of the engine, and with a substantial decrease in specific weight.

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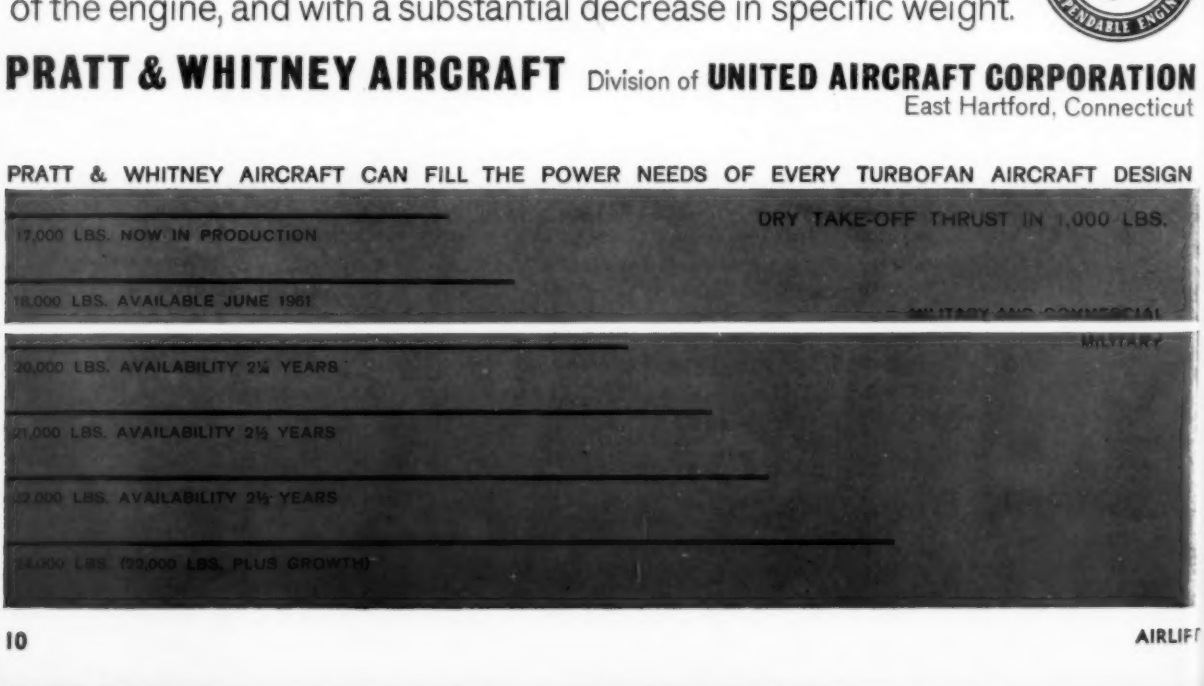
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LETTERS

Transport Progress Issue

To the Editor:

Congratulations on *AIRLIFT'S* 12th annual issue of Air Transport Progress.

You did a fine job not only with Facts and Figures but also with the great number of important statistics which were gathered on the individual airlines, as well as the recognition of and various stories on the problems facing the industry.

You produced truly a "reference book" that will be used throughout the year.

S. G. TIPTON
Air Transport Association
Washington 6, D.C.

To the Editor:

Congratulations on *AIRLIFT'S* 12th Annual Air Transport Progress Issue. It is the finest yet and I haven't put it down since receiving it yesterday. The many timely articles and charts will, I am sure, be referred to over and over again in the months to come.

VERNON A. TAYLOR
New York, N.Y.

'Pilot Talk' Rebuttal

To the Editor:

I read with interest the "Pilot Talk" article by Captain Larry Shapiro in your April issue. I am, of course, fully aware of the limitations of our current system and of some of the present-day components of that system, such as radar. I would like to assure your readers that we are making, and will continue to make, every effort to overcome these limitations and achieve the maximum possible efficiency in the air traffic control system at the earliest possible date.

I should also like to point out that we support Captain Shapiro's comments about the need for a collision avoidance system. We believe that when such a system is fully developed and properly used it will provide a final safety check in any system of air traffic control which might be in existence. Furthermore, in areas where there will be a continuing mixture of traffic operating under the visual flight rules and the instrument flight rules, the device should be a primary aid to the pilot in detecting and avoiding uncontrolled traffic.

There are in Captain Shapiro's article, however, certain statements which caused me concern because they indicate either a certain lack of understanding of our present-day operation or a less-than-accurate use of terms which may create a misunderstanding in the minds of some of your readers.

First of all, Captain Shapiro makes a reference to radar controllers seeing only approximately 40 per cent of the military aircraft crossing *positive control airways*. I should like to point out that there is no requirement for a traffic controller to "see" any traffic crossing a positive control airway. These airways, or portions of airways, exist only from 17,000 feet to 22,000 feet along a very limited number of Victor 1500 series airways (except when underlying a positive control area, in which case they go up to 24,000 feet). Within the airspace established as a positive control airway all air traffic must operate in accordance with the instrument flight rules and this traffic is then provided separation by ground control.

The great bulk of this separation (and the *only* separation required) is in accordance with nonradar separation minimums. Radar separation minimums can be used only when all of the aircraft to be so separated have been observed and identified on radar. It follows, therefore, that within the airspace of the positive controlled airways radar surveillance is not necessary, nor can it be used unless the aircraft involved are not only observed but positively identified before the radar separation standards are applied.

I believe Captain Shapiro was intending to talk about the service provided to civil jet transport type aircraft during portions of their flight. This service, known as "jet advisory service," is provided within "jet advisory areas." These areas lie along established civil jet routes from Flight Level 240 upwards to Flight Level 390. Within these areas the civil jet is identified and tracked by radar except in certain segments where radar coverage is nonexistent.

The radar operator will advise the civil jet pilot of the observed traffic and issue vectors around such observed targets unless the civil jet pilot advises that vectors are not desired. The purpose of the service is solely to assist the civil jet pilot to avoid collision with VFR traffic within his vicinity and within the jet advisory area.

No specific separation minimums are established, nor is it intended that any specific separation be provided. All aircraft operating in these jet advisory areas are required to operate a transponder or to receive special permission to operate within the area.

I appreciate the opportunity to express my thoughts on this subject and I hope this will clarify the matter in the minds of your readers.

D. D. THOMAS, Director
Bureau of Air Traffic Management
Federal Aviation Agency
Washington, D.C.

ALPA and the Press

To the Editor:

This correspondence is in reference to the article "32 Strikes Cost The Airlines $150 Million" in the April issue of *AIRLIFT*.

Being a Flight Engineer and a subscriber to *AIRLIFT* places me in a position to put forth some criticism. If you are to print a factual presentation of the airline strike situation then you should give the true reason for each strike and not present it in an article that casts any one group in a bad light, such as you did in this article. I refer specifically to the light in which the flight Engineers International Association was placed.

The article goes on to state, "For example, 15 of the 17 strikes originating from cockpit unions occurred on seven of the eight airlines which have more than one bargaining group on the flight deck."

The article, written factually, should have stated that, "Of the 15 airline strikes in the past seven years, there has been only one that was not either tied to, or

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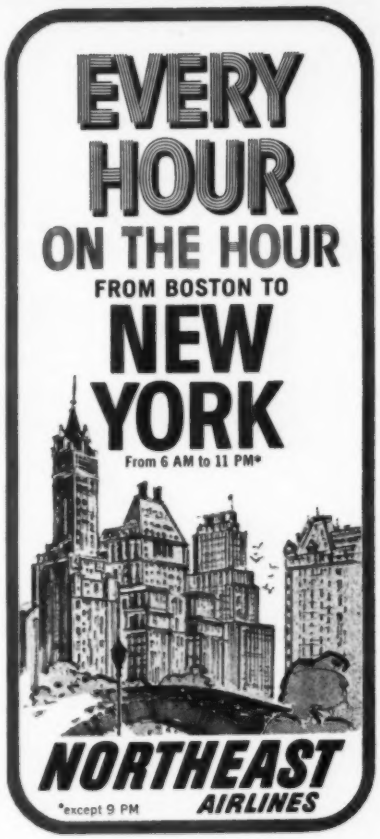

COMING

June

June 2-3—Reading Aviation Service, 12th national maintenance and operations meeting, Municipal Airport, Reading, Pa.
June 6-7—National Safety Council, Air Transport Section, executive committee meeting, St. Louis.
June 11-15—ASME, summer meeting, Statler Hilton, Los Angeles.
June 13-15—Aviation Distributors & Mfrs. Assn., 37th meeting, Dennis Hotel, Atlantic City.
June 13-16—IAS, summer meeting, Los Angeles.
June 14—Local Airline ground equipment/facilities meeting, Minneapolis, Minn. Host: North Central Airlines.
June 14-15—ATA, altimeter & static system subcommittee, Marriott Motor Hotel, Wash., D.C.
June 19-24—ICAO, council assembly, Montreal.
June 20—ATA, board of directors meeting, Wash., D.C.
June 28-30—Institute of Navigation, annual meeting, Williamsburg Inn, Williamsburg, Va.

July

July 17—National Aeronautical Services Assn. USAF contract services symposium, Hotel Washington, Wash., D.C.
June 19-21—Airlines Electronic Engineering Committee, general meeting, Hotel Saxony, Miami Beach.
July 24-26—Electronic Maintenance Engineering Assn., ATC facilities symposium, Mayflower Hotel, Wash., D.C.

August

Aug. 1-2—Airport Operators Council, board of directors meeting, Wash., D.C.
Aug. 19-24—IAS, commemoration of 50 years of Naval Flight, San Diego.
Aug. 22-25—IRE & WEMA, 1961 Wescon convention, Cow Palace, San Francisco.

September

Sept. 4-10—Society of British Aircraft Constructors, annual equipment exhibit, Farnborough, England.

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Continued from page 11

caused directly by, some policy of the Air Line Pilots Association. Unless this organization is checked, there will be other strikes and this horrible situation will exist until either the Air Line Pilots Association is stopped by public indignation or until it entirely controls the airline industry."

Time and time again I have witnessed a reluctance, on the part of those responsible for reporting, to print any statement that would cast the Air Line Pilots Association in a bad light, even at the expense of truth. Does this group scare you also, sir?

RICHARD A. JUREWICZ
Massapequa Park, N.Y.

Ed. Note: *Negative. Over the past three years we have given pilots and engineers equal representation in this jurisdictional issue for which both are to blame and which neither of their unions (nor their parent AFL-CIO) has been "big" enough to settle.*

The rules say airplanes must have pilots and engineers and it was the labor 'unions' obligation to permit airlines to live up to these rules without the continuing threat of work stoppage. In this they have failed miserably. As distasteful as might be the need for government intervention perhaps now a Presidential commission will resolve the issue once and for all.

Kashmir and Pakistan

To the Editor:

I read with great interest the article "Pakistan Joins North Atlantic Ranks" by Anthony Vandyk in the March issue of *AIRLIFT*. However, may I draw your attention to a few points in the article which need correction.

The map accompanying the article shows the State of Jammu and Kashmir as part of India, although the writer himself notes that this territory is disputed by India and Pakistan. The fact is that the United Nations is seized of this dispute and the State is not recognized as a part of India. Until such time that the people of the State have decided in a free plebiscite under United Nations' auspices as to whether their State should accede to India or Pakistan, it should be shown as disputed territory. United Nations' maps also show it as such.

In writing of Kashmir, the writer also says that the only good roads open most of the year go from India. I am afraid this is incorrect. The economic and geographic integration of the State of Jammu and Kashmir has always been with Pakistan.

Until the dispute arose between India and Pakistan all trade from Kashmir went through the territory that is now Pakistan and not through India simply because a very small portion of the State is contiguous to India and there is only one road linking the State with that country. This road is not an all-weather road. It is unusable in the winter. Some years ago the Indians constructed a tunnel linking their territory with Kashmir but the tunnel was blocked by a land slide. It is at the mercy of the weather.

Incidentally, Pakistan is the fifth largest nation in the world with a population of over 93,000,000. In area it is equal to the combined areas of France, Italy, Belgium and Holland.

S. M. HAQ
Press Attache
Embassy of Pakistan
Washington, D.C.

Cargo Solution

To the Editor:

Your comments on "The Cargo Solution" was in your usual realistic and refreshing manner. It is indeed time to stop trying to mate military and commercial requirements. It is also time to stop waiting for some manufacturer to build a truck or freight car with wings and expect to get a further reduction of direct operating costs. Let's face the fact that we are going to have to haul airfreight in airplanes. I am sure that if trucks and buses cost $6 million per copy they would be very similar in appearance and construction.

With the current turbine-powered cargo aircraft on the market, we are down to within 2.5¢ per ton-mile direct operating cost of the largest over-the-road truck. Let's roll up our sleeves, clean up our ground operations problems, and go out and sell our superior product at this new bargain price instead of continuing to stand around talking about "a future breakthrough."

RICHARD J. BEARDSLEY
Woodstock, Illinois

Selig Altschul, independent aviation consultant and contributing financial editor of AIRLIFT, is now serving as a member of the National Aviation Goals Task Force, "Project Horizon." He will resume his financial writings for AIRLIFT upon completion of this work, July 1.

BOOKS

United States Aircraft, Missiles and Spacecraft, 1961; Aerospace Industries Association, 610 Shoreham Bldg., Wash. 5, D.C.; $1.50. This publication of the AIA is offered annually as an educational service in cooperation with the National Aviation Education Council. The issue has 160 pages listing all aircraft and missiles that could be identified as being in production at the time the booklet went to press.

The booklet also includes a summary of outstanding aerospace events, records made and summary coverage in the field of astronautics. A listing of aircraft used for passenger operations, helicopters, and air taxi equipment rounds out the compilation.

Airport Drainage; Prepared by the Airports Div., Bureau of Facilities and Materiel, Federal Aviation Agency; Printed by the Government Printing Office, Wash. 25, D.C.; 1960; $0.30. This publication is aimed at the engineer responsible for recommending and designing airport drainage. It includes studies of local climate, soil and topographic conditions which must be made to tailor a drainage system to a specific location. Many maps, charts and graphs will prove helpful to the airport engineer.

Europa Year Book: 1960; Europa Publications Ltd., 18 Bedford Square, London, W.C.I. England; $25 per volume. The Europa Year Book, 1960, is a world survey including statistical material relating to area, population, industry, resources, government, entertainment media and education. Designed for quick reference, the Year Book is presented in two volumes: Vol. I covers Europe, the U.S.S.R. and Turkey; Vol. II: Africa, the Americas, Asia and Australia.

Aircraft Disinsection: The Eleventh Report of the Expert Committee on Insecticides; World Health Organization, Technical Report Series, No. 206; WHO, Palais des Nations, Geneva; $0.30. This report reveals startling facts on failure of international airports to comply with the requirements of the International Sanitary Regulations with regard to mosquito and other insect control. The report urges the establishment of a vector control organization at each international airport and requests WHO to provide governments with the necessary technical advice.

The prevalence of in-the-air disinsection of aircraft with aerosols was described in the report, which noted that the method has proved to be ineffective. The report recommends that disinsection be performed after passengers have embarked and the doors have been locked, immediately before takeoff. New chemicals for the purpose have been developed and the report strongly urges their use at more international airports.

Airport Runway And Taxiway Design-Excerpts On Typical Configurations, Capacities, Evaluation of Designs; Airborne Instruments Laboratory, Cutler-Hammer, Inc., for Bureau of Research and Development, Federal Aviation Agency; July, 1960. Order PB 171 370 from OTS, U.S. Department of Commerce, Wash. 25, D.C. $3.00. This report is part of a continuing FAA study of civil aviation facilities in the U.S. The actual research was done by contractors required to obtain an up-to-date picture of actual current operations and practices, apply new mathematical and analytical techniques to airport operations, and make practical application of these factors to the development of design criteria and airport configurations.

The evaluators report that it is possible to document the so called "pressure factor," which they describe as ". . . that factor which evidences itself in higher efficiency at higher operating rates." As controllers and pilots accustom themselves to the tempo of the operation, they reduce spacings and react more promptly to traffic control.

Mathematical formulas are presented which use observed operating data in relating delay to movement rates for runway operations, and for analyzing taxiways and holding aprons. Guides for application of these formulas are included.

Study of Pilot Operational Capabilities In the Use of the FAA Pictorial Position Indicator and the Avion Pictorial Navigational Display in the Terminal Area. National Aviation Facilities Experimental Center, Atlantic City, N.J., for Bureau of Research and Development, Federal Aviation Agency; February, 1960. Order PB 171 368 from OTS, U.S. Department of Commerce, Wash. 25, D.C.; $2.25. Tests were conducted to determine how accurately a pilot could fly selected or predetermined routes, in a terminal area, as depicted on navigational pictorial displays using VOR/DME information.

Other tests developed data on the effect of pictorial-display-equipped aircraft on the communication workload for both pilot and controller. In-flight testing and simulation were used in the research. The study includes 30 illustrations, a glossary of statistical terms, and computer data sheets.

Wayne Parrish reports to the travel industry:

Side trips: up or down a lazy river in PARAGUAY

Off the beaten track. (But not too far off; and not off for long)

If you have clients who would like a vacation from factory smoke and near misses on the highway, send them off for a visit with the past in Paraguay. (If you're in that frame of mind, send yourself while you're at it.)

Send your clients to Buenos Aires, for a river steamer trip up the Paraná and Paraguay Rivers to Asuncion, the capital of Paraguay. Or do it the other way around: send them direct to Paraguay (the big jets now serve Asuncion), and *down* the rivers to Buenos Aires when they leave. Just between us, this is one of the most delightful aquatic voyages in the world.

While in Paraguay, the traveler with an eye for people and things would do well to look around. The people are relaxed and friendly. Their country is a little jewel of deep rivers, deep forests and wide plains—set right in the center of South America.

The stately Pantheon in Asuncion — where Paraguayan heroes are buried.

Paraguayans are not against progress, but they are willing to take their time about it. Spanish is the official language, but not everyone bothers to learn it. (Curiously, the Guarani Indians are just about extinct, but their language lives on.)

The spectacular 2½-mile crest of the mighty Iguazu Falls, near the Paraguayan border.

History buffs who do their buffing in Paraguay won't find evidence of pirates and sunken treasure. (There are just two landlocked countries in the Western Hemisphere — Paraguay and Bolivia, next door.) But they will find other splendors. Asuncion was the first Spanish settlement in the area. It was founded in 1535, before the parents of most of our pilgrims were born. (Settlers *from* Ascuncion founded Buenos Aires.)

Asuncion today is a beautiful, modern city of wide streets and spacious plazas. Old churches and forts abound. Bargain hunters should look into the native Indian crafts — particularly in wood carving, leatherwork and lace.

Paraguay is also a paradise for those who fall for waterfalls. The best waterfall watching is to be done on another river trip, on the Paraná along the south and western borders. (The Paraná, by the way, bears no relation to the "piranha," the little 6-inch fish that likes to pretend he's a shark. That little devil lives up around the Amazon.)

Near Porto Adella on the Paraná, a magnificent series of 18 cataracts form the Guiara Falls. The highest drop is 130 feet, and it has the largest flow of any waterfall in the world — twice the volume of Niagara.

And that's just the beginning. A few miles to the south, one finds that Paraguay misses owning one of the world's greatest natural wonders by a scant 16 miles. There, the Iguazu River plunges over a 237-foot precipice. Our Niagara is only 167 feet high. What's more, the Iguazu Falls are 2½ miles wide — more than twice the width of either the Niagara or the Victoria Falls on the Zambezi.

These are just a few things that make Paraguay fascinating — a superb side trip from Buenos Aires or an exciting venture for its own sake. I haven't mentioned the climate which is ideal — on the pleasantly warm side of the Temperature Zone. The year 'round average temperature is 71°.

So if you have clients who would like a respite from air polution and such things, send them (happily) up the river in Paraguay.

We are most impressed by Mr. Parrish's knowledge of Paraguay — a country that's not too well known here in the U.S. We have been serving Paraguay for years, and can certainly attest to its charm.

Majestic Braniff El Dorado Super Jets fly to both Asuncion and Buenos Aires — Sao Paulo and Rio, too, while we're in the area.

In all, Braniff serves 12 major cities in 10 Latin American countries, with Super Jets from New York (via Braniff-Eastern) and Miami to Panama, Colombia, Peru, Brazil and Argentina; or luxurious DC-7C's from Texas.

What's more (beside providing service that makes clients feel like the most important travelers on earth), we can help arrange tours in all the best parts of Latin America. Try us. Write "Tour Department," Braniff, Exchange Park, Dallas, Texas.

BRANIFF *International* AIRWAYS

AIR TRANSPORT TRENDS

ATC

Airways costs are skyrocketing. FAA anticipates obligating more money for R&D and maintenance of the domestic U.S. navaid and ATC system in fiscal 1960-63 than it did during the entire period 1929 to 1959. The four-year total will be $2.03 billion; first 31 years cost $1.74 billion.

Management

Delays in 990 program were no small factor in recent Convair management shakeup. As a result, customers are now optimistic that revised delivery dates will be met, if not bettered.

Sabena's initiative in forming two airlines seems likely to pay off. Later this year the two carriers, Air Cargo and Air Katanga, will start services to Europe using aircraft leased from the Belgian airline. Within the two African territories the Sabena-backed companies will operate all scheduled domestic services despite attempts by Aeroflot to organize competition using Russian equipment.

Equipment

Several European lines plan to re-engine their jets with turbofans. Irish International is putting Pratt & Whitney JT3Ds into its Boeing 720s. Swissair is negotiating for re-engining of at least one of its DC-8s with JT3Ds. European carriers are gradually realizing that the performance gain will rapidly offset the high conversion cost, which tops $2 million.

Sud Aviation is concentrating its sales effort on the Caravelle 7. This version is powered by the General Electric CJ-805-23. Market research department of the French manufacturer is still studying the potential for the Junior Caravelle, a shortened-fuselage version in the same class as the BAC-111 (see p. 23). A high-priority activity in sales is preparation for marketing the supersonic Super Caravelle.

Swissair is pleased with lease deal involving two Convair 880Ms. It leased the planes from General Dynamics pending availability of the 990. The deal cost the Swiss very little and will enable them to put jets on routes to the Far East in September. Separate agreement was made between Swissair and GE for lease of the 880M's CJ-805 engines.

Labor

Shipboard VORTAC evaluation is under fire from Transport Workers Union. Although its criticism of tests by FAA is leveled at numerous other areas, such as cost, need for user charges and early obsolescence, its real purpose is obvious: to prolong the life of its navigator members in international operations. But TWU's fight appears to be a losing one, particularly in light of other developments, such as self-contained doppler systems now being considered by a number of airlines.

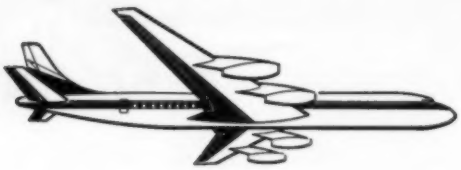
Advertising

There's growing sentiment for an industry advertising campaign. Additional sources of revenue are needed to fill increasing number of available seats. Although some airlines are only lukewarm to the advertising idea, more and more sales officials are becoming convinced it would help.

Sales

More attention is being given to domestic charters. Latest airline to change its attitude, heretofore "indifferent", is American. The company did $1,725,000 worth of charter business last year, is aiming for $2.5 million in 1961. Two DC-7s are assigned exclusively to this traffic. AA says it gets $1.50 charter revenue for every $1 spent out-of-pocket to bring in this business.

Built to cut air fr



New Douglas pure jet cargo-passenger transport will cut direct air cargo costs to less than 4¢ per ton mile.

Here is the cost breakthrough long awaited by airlines and shippers. The Douglas Jet Trader will airlift 26 tons of freight and 54 passengers. Direct costs for coast-to-coast or intercontinental operation will be less than 4 cents per ton mile with only 27 passengers. This ton-mile cost is based on passenger rates 20% *lower* than current non-jet economy fares.

Cargo-Passenger Concept Solves the "One Way" Problem, Too

Jet Trader passenger fares will more than pay costs on normally unprofitable return flights, making reduction in tariffs possible.

Most Modern Jet Transport of Its Era

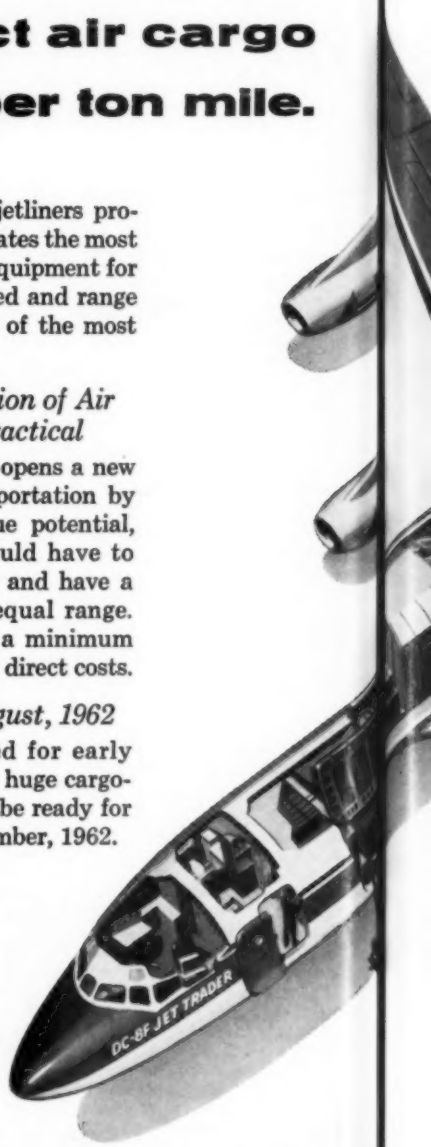
The Jet Trader gives passengers the same comfort and conveniences that the DC-8 all-passenger jetliners provide. And it also incorporates the most modern techniques and equipment for handling freight. Its speed and range are comparable to those of the most advanced jetliners.

Makes Vast Expansion of Air Freight Traffic Practical

The Douglas Jet Trader opens a new era of mass cargo transportation by air. To equal its revenue potential, an all-cargo aircraft would have to be built one-third larger and have a capacity of 46 tons at equal range. It would have to carry a minimum of 23 tons of cargo to pay direct costs.

Makes Debut in August, 1962

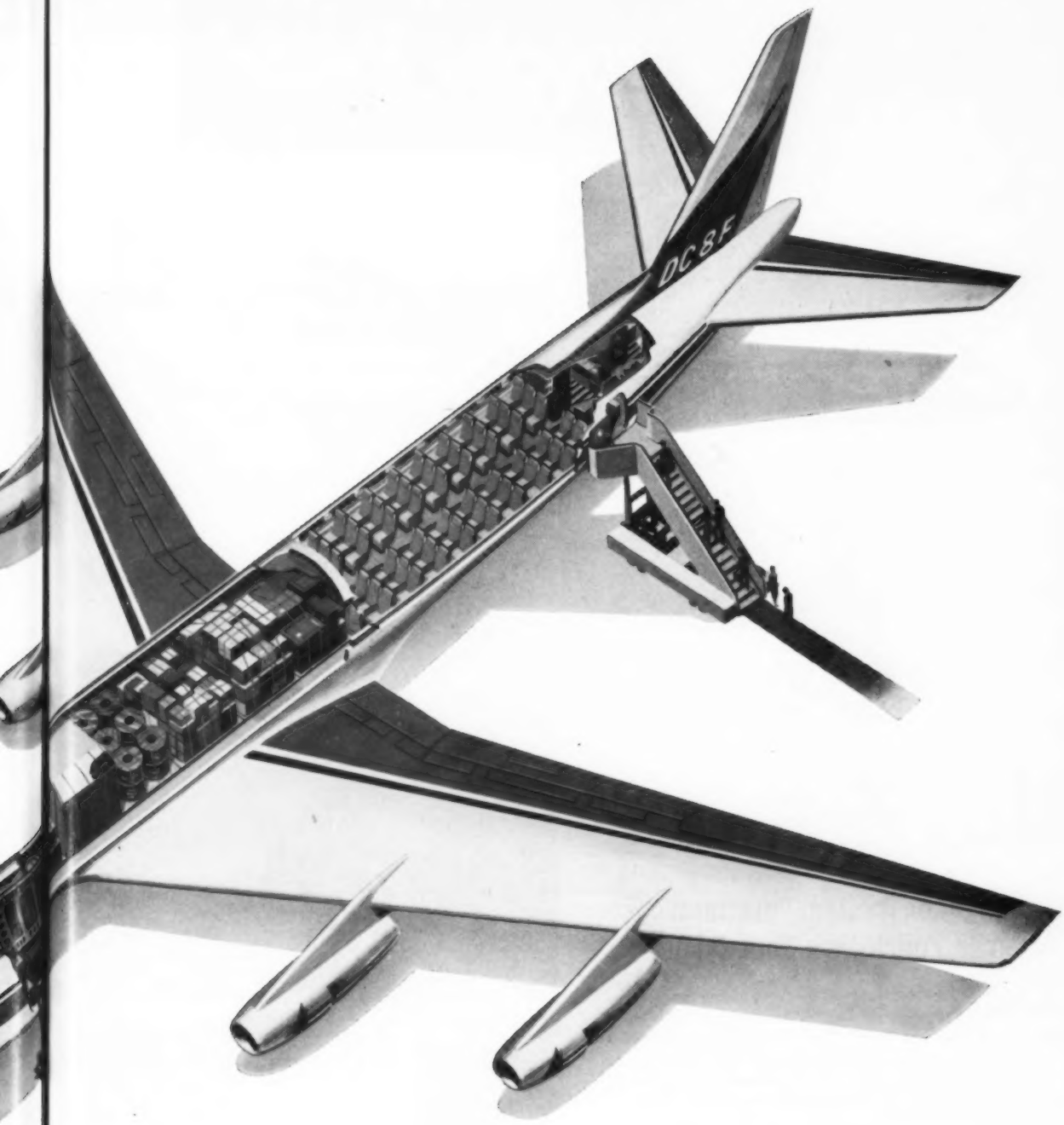
First flight is scheduled for early August of next year. The huge cargo-passenger transports will be ready for airline operation in November, 1962.



The Douglas Jet Trader will cruise at 575 mph, have a maximum range of more than 7,000 statute miles. Its four Pratt and Whitney JT 3D-3 fan engines provide 72,000 pounds of thrust. The freight section has an 86 x 140 inch forward door to accommodate the mechanized loading of nine large pallets. They will be moved through the cabin on rollers and guide rails and locked into place on floor tracks.

New DC-8F "Jet

rght rates in half!



ader" by Douglas

SWISSAIR chooses Bendix Doppler Radar

Jet navigation system "masterminds" 3900-mile Zurich-New York flights

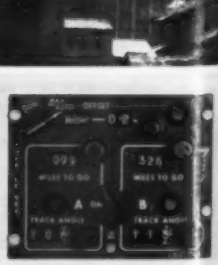
With typical Swiss appreciation of precision and dependability, SWISSAIR is equipping its DC-8's, and Convair 990's, with Bendix® Doppler Radar Navigation Systems. With their recognized achievements in reliability and accuracy, Bendix Dopplers provide an entirely new dimension in operational efficiency. Continuous read-out of ground speed, drift angle, distance-to-go, and course information greatly simplifies long overwater navigation—reducing in-flight time and conserving fuel.

Completely transistorized*, the Bendix DRA-12 Doppler Radar System and companion CPA-24 Navigation Computer System incorporate the latest state-of-the-art techniques and are designed for maximum maintenance accessibility. For dual system operation, only a single antenna is required. Get further details by writing . . .

*Except for Klystron and voltage reference

Doppler ground speed and drift angle indicator.

Computer-controller reads out miles-to-go and miles left or right of course.



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SOUTHWEST—Bendix Radio Division, 2505 Mockingbird Lane, Dallas 35, Texas
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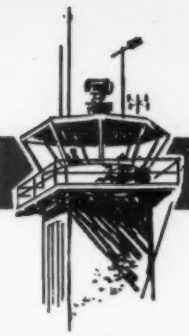
INTERNATIONAL—Bendix International Division, 205 E. 42nd St., New York 17, N. Y.
CANADA—Computing Devices of Canada, Ltd., P. O. Box 508, Ottawa 4, Ontario

INDUSTRY AT A GLANCE



INTERNATIONAL

Atlantic boom—Transatlantic air travel made big gains in 1961's first quarter. But the passenger growth didn't keep up with the increase in capacity; there were plenty of unsold seats.

Passengers totaled 293,675, up 28.8% over 1960's first quarter, while capacity jumped 46.9% to 589,674 seats. The 49.8% load factor was off seven points. About 83% was economy fare traffic.

Even more spectacular than the passenger growth were cargo and mail gains—34% and 45.6%.

Revitalized Guest—New financing and jet equipment make Guest Aerovias Mexico an airline to watch.

New capital comes from a group of Mexican financiers, including Carlos Trouyet, Hernandez Delgado and Eduardo Villasenor, all of whom are now board members. Conrad Hilton is also a director. Folke Egerstroem continues as president.

Using Comets on an interchange basis with Mexicana Airlines (CMA), Guest's loads are near capacity on Mexico-Miami/Miami-Europe routes.

Scandinavian Airlines System did not participate in the new financing, but maintains a close working relationship with Guest. SAS' past capital contributions will be repaid by Guest out of profits. SAS also continues as general sales agent.

CARGO

Cargo agreement—After two previous failures, IATA airlines agreed on Atlantic cargo rates. Adopted was a U.S.-backed weight-break system that will mean lower rates, particularly in higher weight brackets. Specific commodity rates were cut from 75 to 39.

New general commodity rates, New York-London: under 45 kilos, $2.20 per kilo (2.2 lbs.); 45-99 kilos, $1.52; 100-249, $1.10; 250-499, 90¢; 500-999, 80¢; over 1000, 72¢. There is a special eastbound rate of 68¢ for 75 kilos and over.

If approved by governments, rates are effective from Sept. 1, 1961, to Mar. 31, 1963.

MAIL

Flight 21—Out of New York every night at 11:15 goes American Airlines' Flight 21, the first nonstop transcontinental jet aimed at mail.

The flight, which started May 7, arrives in Los Angeles at 1:55 a.m. local time, enabling the Post Office to proclaim that letters mailed in New York by 7 p.m. will receive first-morning delivery on the west coast, from Sacramento to San Diego.

By the end of the first week, AA already had hauled 8000 lbs. of mail on a single flight. Air express had hit 1600 lbs. With mail paying 40.5¢ per lb., plus express revenue, the flight should make money with a 30% passenger load factor. In the first week, passenger load grew from 17 to 34.

THE COURTS

Indefinite divestment—Pan American World Airways is ordered to get rid of its 50% stock interest in Panagra—but not yet.

Judge Thomas F. Murphy, after hearing the government's antitrust case against PAA and W. R. Grace, owner of the other 50%, ordered the PAA divestment, but will let CAB decide when and under what conditions. PAA, he said, violated antitrust laws by blocking Panagra's efforts to get a U.S. extension. Grace was cleared.

LABOR

Get tough policy—Solve your labor problems or the government will solve them for you. This is the warning from the Kennedy administration to seven U.S. airlines and two labor unions.

As mediation opened to resolve engineer vs. pilot problems, carriers and unions (FEIA and ALPA) were bombarded by Labor Secretary Goldberg, Najeeb Halaby, speaking as the President's aviation advisor, and Dr. Nathan Feinsinger, chairman of the President's commission considering the dispute. Their warning: if no agreement is reached, the administration will follow whatever course the commission recommends. There were also threats of legislation and the outlawing of strikes.

SAFETY

Who's responsible?—Crash rescue and fire-fighting at airports, subjects handled like a crate of eggs in the past, are not being treated so gently by FAA under Najeeb Halaby.

His airport safety expert, John Bridges, says airports are not doing a very good job in this area. He warned the American Association of Airport Executives that if a better job isn't done FAA may have to issue technical standard orders or other rules.

Airport managers aren't against safety, but they dread the thought of having the liability laid on their doorstep. They point out that turnpikes and expressways haven't had to assume liability for crash or firefighting. What law, they ask, fixes such a responsibility for airports?

AIR NAVIGATION...

ITT ACTS WELL AHEAD OF PROBLEMS

ITT in 1907 developed the equi-signal radio range—basis of today's instrument landing systems.

DME • TACAN • VORTAC
ITT'S ANSWER TO MANY OF TODAY'S TRAFFIC CONTROL PROBLEMS

Just five years after the famous Wright brothers' Kitty Hawk flight, ITT started in avionics. With such a heritage in air navigation it is no wonder ITT developed DME—distance measuring equipment which provides pilots with distance accuracy of plus or minus two-tenths of a mile, yet weighs only 35 pounds.

ITT's DME aboard today's aircraft tunes to any DME, VORTAC or TACAN ground station for continuous distance information. The development of VORTAC and TACAN, the civilian and military rho-theta systems, is an ITT achievement typical of its great capabilities in avionics. Now even greater resourcefulness is attainable through the fusing of two divisions to form ITT Federal Laboratories. In a single company are Research and Development **plus** Manufacture, Maintenance and Service . . . ready to serve the military and industry with the shortest possible cycle between initial concept and delivered system.

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TELPAK: Reservations Miracle!

New AT&T package cuts rates to unprecedented low, promising vast savings in cost to airlines

By ERIC BRAMLEY

A MAJOR REVOLUTION in airline communications is in the making.

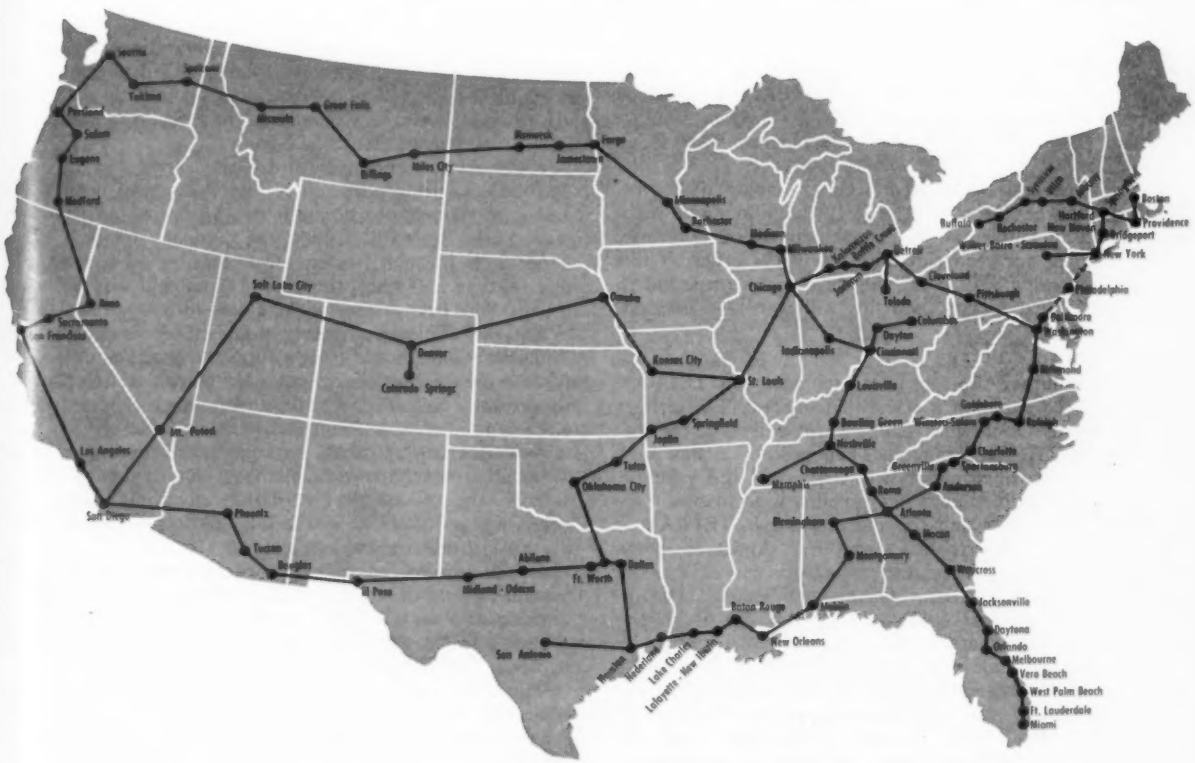
TELPAK, American Telephone & Telegraph's new concept of private line service, is the biggest breakthrough in communications costs in airline history, industry officials say.

It will mean sweeping changes—and savings—in all airline departments. Greatest effect will be in reservations. A major airline can have one reservations office for its entire system. Phone lines can be run into off-line cities at minimum cost. Flight operations and maintenance will also reap benefits.

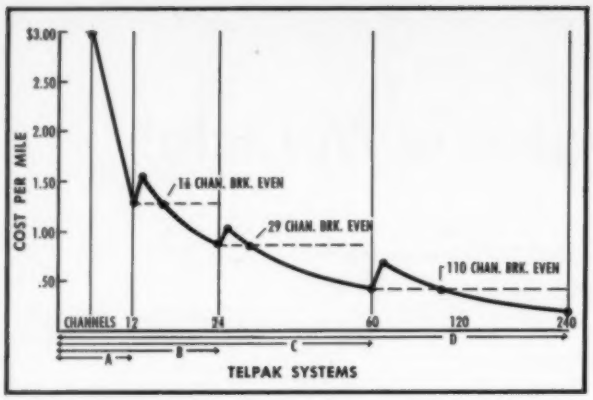
Some TELPAK circuits are now in operation, but planned expansion has come to a grinding halt awaiting the outcome of a dispute between AT&T and the Federal Communications Commission over interpretation of the TELPAK tariff. In the short time between the filing of the tariff and the development of the dispute, airlines had placed orders for some $2 million worth of TELPAK, with another 2 million almost completed, and more expansion still to come.

The regular rate for a private telephone line is $3 a mile. Compare this with the four classes of TELPAK that are offered:

Service A: 12 voice circuits, at a cost of $15 per mile,



THESE TELPAK ROUTES are now in operation or being sought by airlines in their initial applications to AT&T. Virtually every airline participates.



HOW TELPAK COSTS drop with increasing volume of service. The $3.00 rate is former private line phone charge.

or $1.25 per circuit mile. This is 40% of past cost.

Service B: 24 circuits, $20 a mile or 83.3¢ per mile.

Service C: 60 circuits, $25 or 41.7¢.

Service D: 240 circuits, $45 or 18.7¢.

Thus, the price per circuit drops sharply as the number of circuits purchased increases. And it is possible for several airlines to share one of these "packages," each taking a number of circuits, and all getting the lower rate.

The FCC-AT&T squabble stems from the question of how the service is to be furnished. AT&T maintains that all circuits in a TELPAK package do not necessarily have to be in one "pipeline"—that in order to make the most efficient use of its facilities, it may use diverse routes in furnishing the service.

However, FCC, in an Apr. 12 memorandum opinion and order, said: "A multiplicity of channels of lesser bandwidth, derived from different facilities and types of facility, many of which are over diverse physical routes, is not by any test a 'communication path,' a 'TELPAK channel,' or a 'broadband transmission medium.' "

Unless all circuits are in the same pipeline, says FCC, it's no dice.

The past several weeks have seen exchanges of correspondence between FCC and AT&T, the filing and withdrawing of amendments—but no settlement of the issue, AT&T may ask for reconsideration of FCC's order. If this is not forthcoming, TELPAK will have to be furnished in the same physical facility, and this will restrict expansion.

Moratorium on orders

In the meantime, AT&T has not been accepting TELPAK orders, and the situation is somewhat chaotic. The airlines are concerned about what happens to orders placed before issuance of FCC's opinion. Their position is that such orders should be filled either with circuits in one pipeline, or with other facilities until one pipeline is available.

Importance with which the industry views TELPAK is emphasized in a letter to FCC from J. S. Anderson, president of Aeronautical Radio Inc., which has played a major role in coordinating orders for the new system. The industry, says Anderson, "adopted TELPAK not as an end in itself to reduce charges but as the key to extensive rearrangement of airline company activities so as to improve operating efficiency and services to the public generally.

"Virtually every airline the nation over has already made costly alterations in the conduct of its affairs and has made even greater commitments, all based on communication service at TELPAK rates." These new operational concepts would have to be scuttled if such rates were not available, he adds.

Although not all airlines are using the same approach to TELPAK, here are some instances of its application:

Flight operations: Some carriers may centralize operational (dispatch) control. TELPAK circuits are being planned as the backbone of new concepts in coordinating flight information between cities of landing, primarily for improved passenger information and handling. National and Delta, soon to inaugurate transcontinental service, plan centralized dispatch and aircraft/crew scheduling, which is economically feasible only when based on the new service.

Aircraft maintenance: There are plans for TELPAK circuits exclusively for coordination of aircraft maintenance procedures and problems. This is not a new concept to some airlines, but many more will now adopt it.

Reservations and sales: This is the area most affected. For years, airline management has grumbled about the ever-increasing cost of reservations service—the need for more and more people and facilities as traffic grows—and the apparent impossibility of cutting these expenses. TELPAK is the answer. Says one experienced reservations official: "This is the greatest single price breakthrough I have seen."

Generally, each airline has provided a reservations and sales staff at each on-line city and some sales offices at off-line points. TELPAK permits centralizing reservations in a few major cities, bringing major savings in rentals, facilities and personnel. Regional carriers, not previously represented in important off-line cities, can now offer foreign exchange service to their central reservations office.

Inasmuch as TELPAK handles not only voice, but teletype and all other forms of communication, airlines can use it for electronic reservations systems, thus cutting costs.

Dispute delays airline plans

As stated before, some TELPAK is in use, and further orders await outcome of the FCC dispute. United Air Lines is studying its entire reservations system to see where and how it can use the new setup. Continental's customers can now talk directly to Chicago reservations by dialing local numbers in Detroit, Cleveland, Pittsburgh, Philadelphia, Washington and New York. Direct lines to Denver reservations are in operation from San Francisco, Salt Lake City, Omaha and St. Louis.

Allegheny is trending toward a single reservations office. Two offices, Bridgeport and New Haven, have been closed and calls from those communities are being answered by New York. Before TELPAK, the company handled Providence calls through Boston—four lines at $3 a mile, plus one teletype and one private line. Total bill was $690 per month. The new system will cut this to $180.

National has closed reservations offices in Boston and Philadelphia, with the calls going to New York. It plans further moves. Eastern is considering reduction of offices to possibly half a dozen. Pan American reportedly will close a number of U.S. off-line locations.

Delta is using TELPAK in a few places and plans more, although it has no overall plan yet. The company is considering the use of IBM's SABRE electronic reservations setup, and would hook it into TELPAK. Mohawk is working toward one reservations center.

One important item that concerns some carriers is the possible effect of layoffs of reservations personnel. However, some observers point out that turnover in this category is high and this, coupled with transfers of some personnel to other jobs, may minimize the problem.

There is also some fear that centralized reservations may result in an impersonal attitude—that an agent in New York taking a call from a distant point won't give the "friendly" service that a local office would. TELPAK's many proponents say this can be solved by training. The agent will know what city he is talking with, and by being thoroughly familiar with local conditions, can give as good a service as if he were on the spot, they say. ■

Artist's sketch (right) depicts clean lines of new British 'small jet'

BAC's One-Eleven s Viscount Successor

Order by British United Airways springs new jet into production

By JOSEPH S. MURPHY

THE ONE-ELEVEN, a small, smart-looking twin jet transport tabbed as a replacement for the Viscount turboprop, has been unveiled by British Aircraft Corp.

Unveiled is, perhaps, an understatement. For with the announcement BAC officials packaged a first order for 10 worth $22.4 million and option for five from British United Airways, plus a letter of intent from Ozark, a U.S. local carrier, for five more.

At the same time, the company said the new jet would enter production immediately. First flight is scheduled for the spring of 1963 and first deliveries for the fall of 1964.

The One-Eleven is one of the most interesting combinations of price, capacity and performance yet to appear on the transport sales scene. The pricetag, an attractively low $2.3 million, is about double that of the Viscount, but still well below that of any other airline jet announced to date.

In capacity, the BAC jet offers a 57-passenger mixed-class layout or 69 passengers in a five-abreast coach interior. Cruising at 500 mph (540 is maximum cruise), the One-Eleven will match the Viscount in direct cost at very short ranges and will excel at the longer stages, according to BAC.

A simple, straightforward design by present day standards, the One-Eleven will have a 20-degree wing sweep (the same as the Comet and Caravelle) and two aft-fuselage-mounted Rolls-Royce RB163 Spey turbofans rated at 9850 lbs. thrust, each.

Short-to-medium contender

For short to medium-range airline service, its 4800-ft. runway requirement for full-gross, standard-day operation should prove an attraction, not only to local airlines with high-density segments but to trunks which operate medium haul services. And with the combination of lower thrust engines, quieter fan design and short runway requirements, the new jet should pose no community noise problems whatever.

In economics, BAC's analyses by seven different yardsticks indicate it will surpass the performance of the Viscount above stages of 200 miles by an average of 10¢ per mile. It is designed to be economical down to 100-mile stages where the direct cost is estimated at $1.50 per mile.

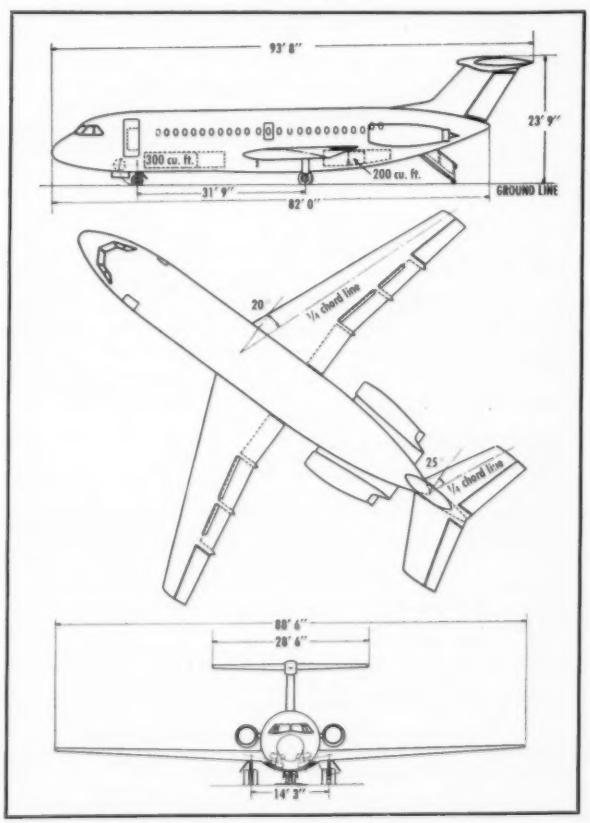
Direct seat-mile cost for a 57-seat layout declines from 2.6¢ at 100 miles to 1.4¢ at 750 miles. With 69 coach seats installed, cost drops nearer to a penny a seat-mile.

By these yardsticks, using ATA costs (indirect equal to direct) and a U.S. revenue of 7¢ per passenger-mile, BAC figures the One-Eleven's breakeven need at 31 passengers for 200 miles; 26 at 400 miles; 22 at 600 miles and only 21 at 800 miles. In other words, the new jet will have a breakeven load factor below 50% for all stages above 200 miles. At European costs and fares, up to two or three

Specs on the BAC 'One-Eleven'

Engines	Rolls Royce RB163(2)
Wing area	980sq.ft.
Aspect ratio	8
Tire pressure at max. weight	120 p.s.i.
Cabin length*	44ft. 6ins.
Interior height	6ft. 6ins.
Interior width at arm-rest height	10ft. 4.3ins.
Main passenger door (fwd)	5ft. 6ins. x 2ft. 9ins.
Height to passenger door sill	6ft. 8ins.
Freight door (fwd)	3ft. 6ins. x 2ft. 7ins.
Freight door (aft)	3ft. 6ins. x 2ft. 7ins.
Height to freight door sill (fwd)	3ft. 4ins.
Height to freight door sill (aft)	4ft.
Capacities	
Fuel (8 lb. per Imp. Gal.)	18,000 lb.
Freight volume	500 cu.ft.
Weights	
Max. ramp weight	66,300 lb.
Max. take-off weight	66,000 lb.
Max. landing weight	62,500 lb.
Max. zero-fuel weight	56,000 lb.
Design max. payload	14,000 lb.

*Cabin length is total accommodational length between lavatories.



more passengers would be required to reach breakeven.

Normal cruise altitude will fall between 20,000 and 30,000 ft. but 32,000 could be used quite comfortably, BAC says. Cabin pressure differential would be 7 psi. A 400-mile segment could be flown at 10,000 ft. below optimum altitude at only a 5% penalty in costs.

One advantage enjoyed by BAC in its development program is that the engine will be debugged in advance by another new design—the three-engine deHavilland Trident. The Spey has been operating on test since December and will be flying in the Trident by the end of this year.

A twin-spool design, the Spey splits its inlet airflow from the low pressure compressor equally between the bypass duct and high pressure compressor. Both the bypass and normal cycle flow are recombined to be expanded through a common exhaust nozzle. Rolls-Royce pegs the specific for the initial 9850-lb. thrust rating at 0.776 lbs/hr/lb at 25,000 ft., ISA and Mach 0.78.

Dry weight of the basic engine will be 2200 lbs., maximum diameter 37 in. and overall length 110 in. from intake face to exhaust cone flange.

Development of the Spey and another turbofan, the Bristol BS75, are the key factors around which the One-Eleven and a smaller model, the BAC 107, programs are planned. BAC took over the Model 107 from Hunting in the amalgamation of the aircraft industry in 1960. A joint Vickers-Hunting-Bristol study of the 107 market potential led to the decision to build first the One-Eleven and then follow about a year later with the 107. With the BS75 rating of 7350 lbs. thrust, the BAC 107 will become a shorter and lighter model, outwardly resembling the One-Eleven but having less sophisticated systems and equipment.

The One-Eleven, for example, will be fully fitted for rapid station handling in shorthaul services. An integral auxiliary power unit will be standard equipment for air conditioning and starting.

Throughout its systems engineering, the One-Eleven will be slanted at the needs of short-range, high-frequency operation with special emphasis, says BAC, on straightforward handling characteristics and low approach speeds.

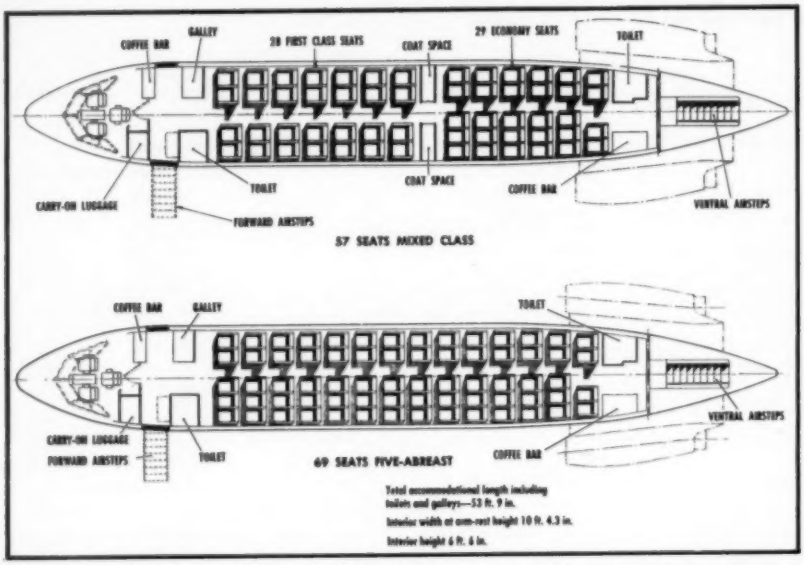
Structural design will embody the "fail safe" philosophy of low design stress levels and multi-load-path structure which experience with larger jets has proven necessary.

Although the predecessor of the One-Eleven had its origin with Hunting, it is strongly evident that the dominant role in BAC will be played by Vickers.

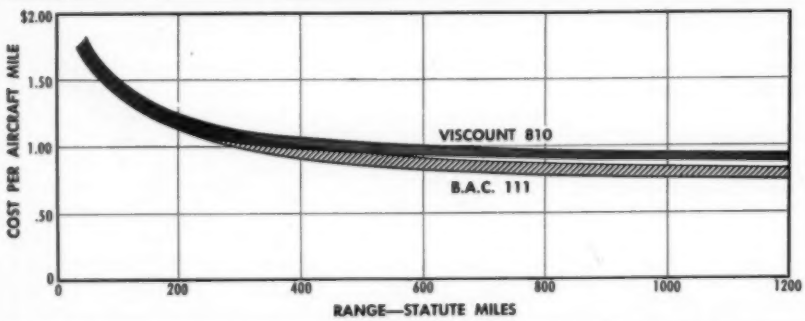
The final assembly line, for example, will be in the Vickers plant at Hurn. As Britain's super transport salesmen, who have successfully marketed 429 Viscounts in 38 countries to 48 different airlines, Vickers sales and service personnel, wearing a new BAC hat, no doubt will carry a lion's share of the load in putting the new program across.

Why the label One-Eleven? There's no official explanation, but it's our guess that as good smart gamblers (and transport ventures certainly require them) BAC's officials picked it as a "natural" to pair up with the 107. This year the "111"—next year the "107."

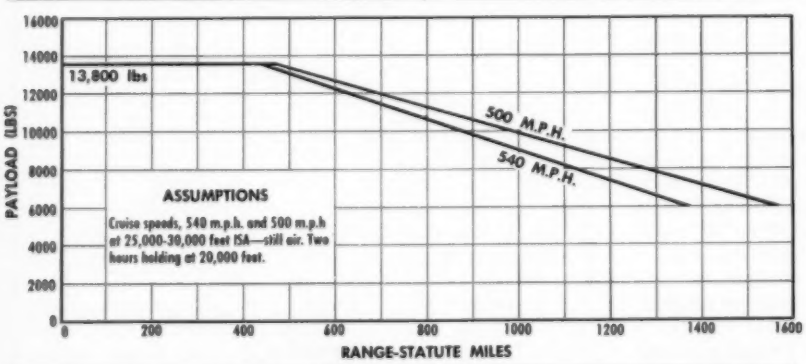
And if the Viscount replacement enjoys only half the good fortune of its predecessor, the 215 sales that result would bring a tidy $500 million in new orders to British industry.



TWO PROPOSED LAYOUTS include mixed class with 57 seats and an all-coach interior which would seat up to 69 passengers.



BROAD BAND of projected costs of new jet reflect seven methods used by BAC including ATA formula (1955 and 1960), SBAC's and cost systems of four airlines.



ONE-ELEVEN is designed to operate 450 miles at full (13,800 lb.) payload. Range with 43 passengers would reach 1200 miles, according to BAC.

Douglas Aims DC-8F At New Markets

Company hopes to strengthen competitive position with new concept of combination passenger/cargo jet

By FRED S. HUNTER

IN ITS DECISION to proceed with the design and manufacture of the combination cargo/passenger DC-8F turbofan to be called the Jet Trader, the Douglas Aircraft Co. has fixed its sights on two major objectives:

1. To retain its strong position in commercial transport manufacturing by extending its market for big jets where up to now its DC-8 has been outsold by the Boeing Airplane Co.'s more flexible 707/720 line of aircraft;

2. To open up new markets for the airlines by building an airplane which would make possible lower rates both for freight and passengers.

President Donald W. Douglas, Jr. has given the company's engineering and manufacturing departments the green light to proceed "at top speed" on a prototype to fly in August, 1962. This will be a new aircraft rather than one taken from the present DC-8 line and converted to

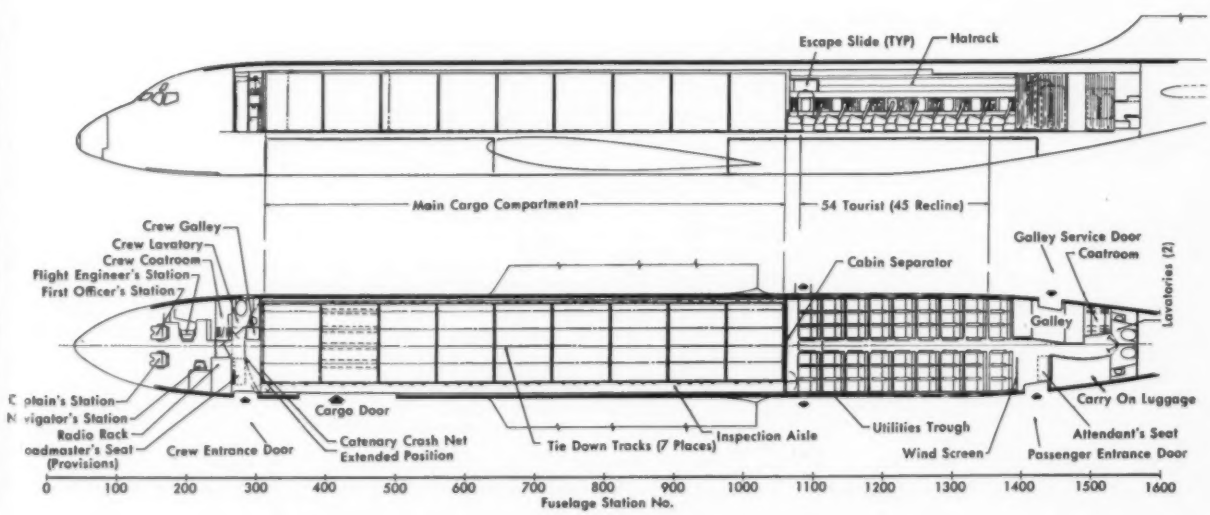
SPECIFICATIONS

Manufacturer:	Douglas Aircraft Company, Inc. Santa Monica, California	
Model:	DC-8F	
Crew:	4 plus cabin attendants	
Capacity:	Passengers — 54 Cargo — 5,370 cu. ft.	
Dimensions:	Span	142′ 5″
	Length Overall	150′ 6″
	Height Overall	42′ 4″
Area (Sq. Ft.)	Wing (including aileron)	2,868 sq. ft.
	Sweepback at chord 25%	30 degrees
Landing Gear	Type — Two sets of dual tandem main wheels and steerable nose wheels. Rear pair of main gear caster.	
	Tread of main wheels	20′ 10″
	Wheel base (fore & aft)	57′ 6′

PERFORMANCE

Engines	P&W JT3D-3
T.O. Thrust	18,000 lbs.
Des. Gross Wt.	312,000 lbs.
Max. T.O. Wt.	310,000 lbs.
Des. Lndg. Wt.	217,000 lbs.
Manufacturers' Empty Weight	123,000 lbs.
Operating Empty Weight	128,500 lbs.
Zero Fuel Weight	192,000 lbs.
Fuel Capacity	23,397 gals.
Fuel Capacity at 6.7 lbs/gal.	156,760 lbs.
Payload (1)	62,610 lbs.
Lev. Fl. Speed (2)	579 mph
FAA T.O. Field at Max. T.O. Wt.	8,850 ft.
FAA Lndg. Field at Des. Lndg. Wt.	6,820 ft.
Max. Range (3)	7,090 st. mi.

(1)—Space Limited
(2)—Max. Cruise Thrust at 220,000 lbs. (30,000 ft.)
(3)—Still Air, Zero Payload, Capacity Fuel



MIXED PAYLOAD arrangement in DC-8F provides for cargo in forward two-thirds of fuselage and six-abreast tourist seating in aft third.

the combination cargo/passenger configuration.

Deliveries, Douglas says, can start in December, 1962. Price of the aircraft will be in the area of $6.5 million, or slightly higher than a conventional passenger DC-8.

The Jet Trader configuration announced by Douglas contemplates using approximately two thirds of the cabin for cargo with a separate aft section for 54 high density passengers, but it is likely that a moveable bulkhead arrangement will be worked out to permit carriers to adjust for varying load conditions.

By combining freight and passenger economics, Douglas comes up with interesting figures for its Jet Trader concept. E. F. Burton, vice president-engineering, said the DC-8F could carry a payload of nearly 63,000 lbs. 3100 nautical miles in intercontinental schedules in the Atlantic. This would allow for 54 passengers plus 26 tons of freight. Using the ATA 1960 formula, total operating costs are calculated at $3.23 per mile. Revenue from 54 passengers at 5.7¢ per mile (a reduction of 20% from present economy fares) would be $3.08 per mile. Revenue from 26 tons of freight at 15¢ per ton-mile (approximately half the 30 to 35¢ per ton-mile rate currently in effect) would come to $3.90. Total revenue adds up to $6.98 per mile. This means a breakeven load factor of 46.3% for an intercontinental DC-8F in the Atlantic even though lower rates are charged both for freight and passengers.

Using similar assumptions, breakeven load factor for a domestic New York-Los Angeles flight would be only slightly higher, 51.5%, Burton said. He put the estimate of total operating costs, including direct and indirect, at $2.89 per airplane mile. Using 4.5¢ per passenger mile as the basis for a reduced passenger fare and 12¢ per ton-mile as a reduced freight rate, the revenue potential for a coast-to-coast trip would be $5.55 per mile.

Low development costs

The DC-8F can be developed at minimum cost because major design changes will be limited to a big forward door for cargo (86 x 140 in. or three ft. wider than the DC-7F), a cargo floor, moving of the aft pressure bulkhead 10 feet back to enlarge the cabin and changes in related interior fittings. It is estimated that approximately 90% of the standard DC-8 tooling at the Douglas company's Long Beach plant can be utilized in production of the DC-8F.

Freight section of the Jet Trader will contain provisions for mechanized loading of nine pallets, each measuring 81 x 110 in. Pallets will be moved through the cabin on rollers and guide rails and locked into place on floor tracks.

Passenger compartment will incorporate six-abreast seating with accommodations identical to those in tourist sections of present DC-8s, including two doors, a galley and two rest rooms.

Douglas is entering the Jet Trader program with no commitments from any airlines, but said several customers in the international field are interested in the aircraft. It expects first sales to come from long haul operators, extending later to medium range carriers. Douglas market research engineers foresee the DC-8F as the answer to the return haul problem which has kept a number of carriers from penetrating the air freight market. Airlines such as Delta, where the direction of freight is almost entirely one way, would be able to pick up compensating return haul revenues from passengers with DC-8Fs, it is pointed out.

Douglas also anticipates the combination characteristics of the DC-8F should have great appeal for contract and charter operations.

Douglas offers no specific figures as to the potential market for DC-8Fs, but points out that only .03% of the freight moving in the U.S. today is carried by air and that whenever rates are reduced, the growth curve immediately responds with sharp upward extensions. ■

Technica

Q. *What are the principal activities of ICAO today?*

A. The technical activities are still our number one task. We continue to keep up to date our international specifications, which are called standards and recommended practices and procedures, and our regional plans. We were hopeful about three years ago that we had reached the stage where frequency of change in those specifications was going to diminish, but practice has shown that we were wrong. We continue to have to keep them up to date.

That alone is quite a task. To bring together the minds of all our states, especially those more actively attending our meetings, is not easy. Although we are always improving on this, one has still to convince the states that a specification can be made to apply on a world-wide basis.

Our other constant problem concerns the regional plans, which detail the ground facilities necessary for air navigation all over the ICAO world. In some regions, particularly Europe, the change has been constant. New operations, especially those of jets, have required complete reshuffling of the plans. Requirements for airport radio aids and for more safeguards in air traffic control are increasing.

In addition, we have the problem of implementation. We need states to apply all those regional plans. To get people to buy the equipment and find persons with the ability to operate and maintain it is difficult in many parts of the world.

Technical assistance is trying to fill in the gaps, but in certain cases we are filling in gaps and new gaps are coming up. That has put emphasis on implementation. We have been very active for the last three years, and we will continue to be very active in this particular field for years to come.

Q. *Can you give examples of some results?*

A. The speed of communications in southeast Asia definitely has improved. The airport situation in South America, which looked pretty bad two years ago, is better today. It looks very good for one year hence. Countries foresee the possibility of extending airport runways.

Where facilities for jets looked remote, they have done the job pretty fast. This is not exclusively due to ICAO, but I think we have been influential. All the main cities on both sides of South America have airports (or will have shortly) where full-payload operations with 707s or DC-8s are possible.

Q. *Where are deficiencies in airports and navigational aids at the present time?*

A. The airport situation still has to be improved in some countries in the Middle East, in southeast Asia and in certain parts of Latin and South America. In radio aids, I would say South America is one place where there is still a lot to be done. To a lesser degree, the Middle East, and

An interview by Anthony Vandyk

ica Role Still Tops in ICAO

Need for coordination has not slackened, says council president Binaghi of International Civil Aviation Organization

ICAO's Walter Binaghi

in a still lesser degree southeast Asia, are areas where there are deficiencies.

Q. *How much does ICAO cost?*

A. Our gross budget for 1962 is in the order of $4,800,000. Contributions are calculated in accordance with a scale which is based on capacity to pay by member nations and their importance in civil aviation. Capacity to pay accounts for 75%, importance in civil aviation for 25%.

There is also a limitation: no state can pay more than 30%. If we would allow a state, because of capacity to pay or importance, to pay, say, 50%, we would be too dependent on that state. The United States is the biggest contributor and would pay more if it were not for this clause. The other main contributors are the United Kingdom, France, Canada and Germany.

Q. *Do you have any other funds at your disposal?*

A. Yes, technical assistance funds which currently run about $1½ million a year and "The Special Fund" in which we have about $5 million spread over a period of five years. These additional funds are all spent in the field.

Q. *How is the technical assistance program of ICAO progressing?*

A. We depend, for technical assistance activities, on the funds given to us by the United Nations. Technical assistance is financed by voluntary contributions to the U.N. and these are then passed to the various specialized agencies.

Of the total given to the U.N., ICAO receives only about 7%. However, I think that although we are working for aviation, we must recognize that there are more basic needs of humanity than flying, such as food, health and education, so more money goes to agencies like FAO (Food and Agriculture), UNESCO, and WHO (World Health Organization).

However, with that 7% we have been able to do quite a lot. We have missions in 21 countries and we provide advice to governments and training to students. In addition to this technical assistance money there is a new development in the United Nations, the special fund, which also is made up of voluntary contributions of states. Its aim is to develop basic machinery to induce foreign investment,

In technical assistance we plan from year to year. We have to base our requests for funds on the demands of the governments. We can suggest what is profitable to them, but they have the final say.

The fund is interested only in more important projects. It provides half a million dollars or more, spread over five years, which the governments must match or exceed. It begins as a joint effort by the governments and the special fund, but the governments are supposed to take over completely in five years.

ICAO has training institutes. We already have established one in Bangkok, Cairo, Mexico and Tunisia/Morocco. The last will be a joint operation. Certain trades will be taught in Morocco. Tunisian students will go to Morocco for training. Other specialities will be taught in Tunis, and Moroccan students will go to Tunisia. All those training efforts are available also for students of neighboring countries.

Q. *When will the first of these ICAO training centers be open?*

A. We expect that both Cairo and Bangkok will start operations next month (July), with Tunisia and Morocco a little later. Mexico has been operating for the last eight years, but has been paid by technical assistance funds. Now all the financial burden will be taken up by the special fund.

Q. *What staff do you have on permanent payroll?*

A. 460, with about 380 at ICAO headquarters in Montreal. We have five regional offices in Mexico, Lima, Paris, Cairo and Bangkok. In each of these offices we have about six to eight professional staff members plus clerical services.

Q. *How are joint support projects going?*

A. The convention contemplates joint financing anywhere in the world. If a state declares itself unable to operate the facilities required for international air navigation the council will seek the opinion of states which are interested in the operation of these facilities to see if they are willing to contribute financially.

This happened to Denmark and Iceland. Their facilities (communications, meteorological and air traffic control) are essential for North Atlantic operations. However, neither Denmark nor Iceland are willing to carry the burden of running those services. Because of climatic conditions they are very expensive.

So they have requested joint financing. At the moment we have 16 states whose airlines fly over the North Atlantic who are contributing. The contribution is proportional to the percentage of crossings. We also have ocean stations which are provided by ships permanently stationed across the North Atlantic to provide meteorological observations, radio navigation, communications, and search and rescue.

The safety record over the North Atlantic is very good. We have had only one ditching in the past ten years.

The new submarine cable, laid from the U.K. to Canada via Iceland and Greenland, will become operational in the spring of 1962. It will include one voice and four teletype channels for civil aviation, permitting rapid, consistent communications. Wireless propagation over the North Atlantic is very poor. With this new facility an aircraft will be able to talk to Greenland or Iceland and the information will be passed by cable from there on. ■

UAL Reservations Go 'Instamatic'

New UAL system, developed by Teleregister, links facilities in 68 cities with Denver computer. Cost: $16 million

THE largest, fastest electronic reservations system built to date is being put into operation by United Air Lines.

Called Instamatic, the new system is capable of handling 15 transactions per second. It will cost UAL $16 million over the next five years. Computers in Denver are linked with 1000 agent sets in 150 locations in 68 cities. The system will, for example, inform an agent of the availability of space on any flight on any date up to a year in advance—in less than one second.

Two weeks ago, UAL activated the first phase of Instamatic—space availability. By Sept. 1, the complete system will be in operation.

At present, a reservation involves some 17 different handlings, leaving plenty of room for clerical error, or for losing the reservation entirely. Instamatic will cut the 17 steps to two or three.

UAL, not an airline known for rash statements, says flatly that Instamatic is the largest integrated electronic data processing system ever built for any company. In overall extent, it is second only to the SAGE early warning system.

Eight years ago, UAL established a five-man committee in conjunction with Stanford Research Institute to determine requirements for a reservations system that would serve its needs up to 15 years hence. After these requirements were hammered out, the company retained Teleregister Corp., Stamford, Conn., to design and produce the equipment.

When the system is in full operation, an agent in any UAL office will be able to handle any of these tasks:

Obtain space availability on any flight by querying the computer in Denver.

Sell space, or cancel seats already sold.

Change a reservation.

Obtain flight information—arrival and departure times

To ascertain if space is available, an agent inserts a keyed card, containing all flights on the route involved, into the agent set, and presses keys for date, number of seats, etc. In less than a second, the machine flashes the information.

If the customer decides to book the seat, a reservations card is inserted, and flight, date, type of service and destination are automatically printed on it (a read-out feature enables the agent to double-check this information for accuracy). The agent writes the passenger's name and contact on the card, which is then filed.

Big advantages of Instamatic are speed and accuracy. UAL doesn't claim that all errors will be eliminated, because people will still make mistakes, despite the fact that they're double-checked by a machine in some instances. But errors will be greatly reduced.

It took a breakthrough in development of communications equipment to meet the speed and work requirements of Instamatic. A lot of this gear was ordered from North American Philips Co., New York, which subcontracted work to N. V. Philips Communicatie Industrie, Hilversum, Netherlands. Some 150 tons have been flown to the U.S.

UAL has a five-year contract with Teleregister, with option to renew for three years. Teleregister will handle all maintenance. Although UAL will spend $16 million over the five years, the equipment will pay for itself in less than that time. Example: As reservations volume increases, it will not be necessary to hire a large number of additional personnel.

The company has been using IBM's RAMAC as an interim system. This furnished certain availability information and was only semi-automatic. To record reservations in this equipment in Denver took many minutes.

When the United-Capital merger is final, and until Instamatic takes over all functions in September, UAL will use both Capital's Univac and its own RAMAC, linking the two. Capital's contract for Univac still has a few years to run, and other uses will be found for the equipment after Instamatic takes over.

Some idea of the step forward that UAL is taking can be seen from comparative costs. RAMAC expenses run about $21,000 a month. Instamatic tops a quarter of a million dollars monthly. ■

DENVER COMPUTER CENTER is heart of Instamatic. It is linked with 68 cities via 7000 miles of lines.

AGENT SET gives instant availability information to Miss Sue Ann Blais, UAL Denver reservationist. UAL Photos.

BRITISH
AIRCRAFT
CORPORATION

announces

BAC
ONE-ELEVEN

THE SHORT HAUL JET

JET SUCCESSOR TO THE VISCOUNT

THE SHORT HAUL JET

JET SUCCESSOR TO THE VISCOUNT

WITH EVEN BETTER THAN VISCOUNT ECONOMICS

BAC
ONE-ELEVEN

TWO ROLLS-ROYCE SPEY TURBOFAN ENGINES

...and built by

BRITISH AIRCRAFT CORPORATION

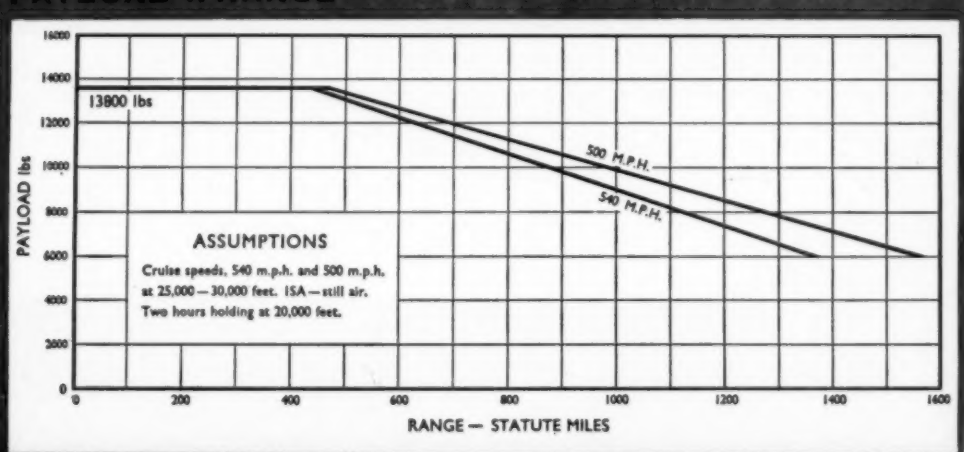
TGA BAS 2

BAC ONE-ELEVEN

THE SHORT HAUL JET

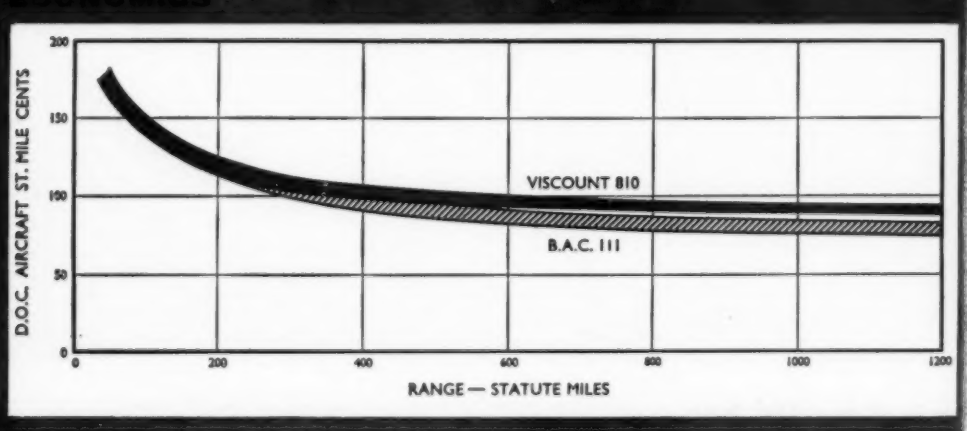
- 540 m.p.h. cruise speed
- 57 mixed class or 69 tourist passengers
- Short airfield performance
- Quick turn-round: built-in auxiliary power unit
- Cabin width for spacious five-abreast seating

PAYLOAD v. RANGE



The BAC One-Eleven can carry its full complement of 57 mixed class passengers and baggage at 500 mph for stages of 800 statute miles with two hours reserves. It can carry 43 passengers for 1,200 miles.

ECONOMICS



These loads cover seven separate periods of cruising — ATA (1955) ... ATA (1965) ... B.A.C. and those of four airlines.

BRITISH AIRCRAFT CORPORATION

ONE HUNDRED PALL MALL, LONDON S.W.1, ENGLAND

TECHNICALLY SPEAKING

By Joe Murphy

ICAO's for whooping cranes . . . Delta tests air data system . . . Bad times in ATCA

Laws against progress?—Although we would class the recent IATA supersonic transport symposium a big success, there was a disturbing political wet blanket thrown over the gathering as the sound of the opening gavel had barely died down.

ICAO's Walter Binaghi, sounding at times like the head of some anti-aviation group, warned airlines and manufacturers that governments will not tolerate another "surprise" such as thrust upon them with present day jets. He hinted that governments will tell airlines when they may introduce supersonic transports and that small governments through ICAO will tell big governments whether they may, in fact, develop a supersonic transport.

Seemingly more interested in such matters as preservation of the birds and bees and the fertility of the rare whooping crane, ICAO spokesmen later in the session contributed little of a constructive nature toward orderly solution of SST problems.

One big point which seems to be escaping Mr. Binaghi & Co. is that when supersonic transportation becomes a practical thing the public is going to want it and someone is going to provide it. True, airlines today can ill afford to commit themselves to new fleets at $15-million or $20-million a copy, but when they *are* ready to make this step, they expect a safe and economical SST to be available to them.

If, through some misguided interpretation of its role in life, ICAO is successful in delaying SST development among its member nations it could well be that this effort might be for naught. For, however distasteful the thought, the leadership in future world air transportation could go by default to nations outside the control of ICAO.

Air data test—Delta Air Lines soon will install an AiResearch air data system in one of its jets in an interesting trial. Although it will be hooked up and operating all the time, the system will be purely an extra.

Delta's engineers will monitor its performance in a "real live" operational test of a system for tomorrow's aircraft.

No true da Vinci—Rome's new $50-million Leonardo da Vinci Airport (*AIRLIFT*, April), a scandal-ridden project before it opened, is making its past critics look like genuine prophets. Only three months after it took over from Ciampino, the main runway had to be shut down for repairs!

Volscan delayed—FAA timetable to begin evaluation of Avco's Volscan air traffic control system has been delayed slightly and tests probably won't get underway until later this month (June). FAA and USAF disagree somewhat on how the trials should be handled. FAA favors four three-month stages with each one justifying continuation to the next, whereas the AF wants a flat one-year program.

ATCA upheaval—Unless the rank and file controllers in the Air Traffic Control Assn. get busy and do something to rectify the situation which brought about the forced resignation of Frank McDermott as their executive director, it looks like they might as well fold ATCA's tent and save their dues. We can't think of a more useless fixture on the ATC scene than a professional society which can say only what FAA would like to hear said.

We were a bit surprised that Administrator Halaby endorsed any kind of action to quiet ATCA. In our book, such effort could better be expended toward putting some "guts" in FAA, to make it an agency that can take criticism and snap back with an answer.

Odds & ends—Delta Air Lines has a dozen DC-3s it hopes to sell as a package sometime during the next six months . . . American Airlines' experience shows the turbofan engine's premature removal rate is superior to an already phenomenal reliability record with straight jets . . . Southern Airways' new interiors for DC-3s rank among the smartest we've seen for any airline, anywhere. Light blue, smart seats, make a new plane of the old DC-3 . . . Rolls-Royce has come up with a spring-loaded bearing for the Tyne to overcome vibration problems on the Canadair CL-44. Engines with the fix will be on hand in August. ■

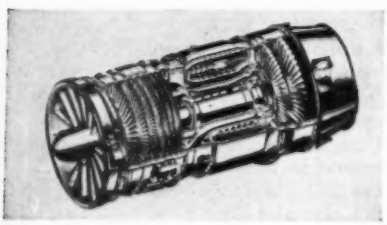
FLAPS AND SLATS—Leading edge of Convair's high-performing Model 880M combines a Kruger-type flap inboard (open arrow) and slats outboard to bring stall speed down to 97 knots at 125,000-lb. landing weight. Slats extend mechanically in 14 seconds. In addition to these leading-edge high lift devices, the Convair jet has a 14-inch increase in flap span over the original 880 and an 18-in. increase in chord at the inboard end. Convair 990 will follow the pattern of 880M in leading-edge design.

Aero Commander Model 1121

Swiss-American SAAC 23

CJ610 Selected to Power Executive Jet Aircraft

LYNN, Mass.—Twin General Electric CJ610 turbojet engines will provide power for new business aircraft recently announced by Aero Commander Inc., and Swiss-American Aviation Corp.



Simplicity of CJ610 design, which is nearly identical to the proven military J85, provides easy inspection, maintenance and disassembly.

The two six-to-eight place executive aircraft will bring Jet Age speed and improved range to the expanding corporate aircraft market.

Aero Commander's Model 1121, known as the "Jet Commander," and Swiss-American's SAAC 23, can cruise over the weather at speeds in excess of 500 mph. Their CJ610 engines, developed specifically for use in business aircraft, will enable both to operate from the same fields as those used by present-day propellor-driven aircraft.

Named as powerplant for the "Jet Commander," the CJ610-1 version produces 2850 lbs guaranteed thrust. The CJ610-2B, to be used in the SAAC 23, produces 2400 lbs guaranteed thrust.

Both versions are compact in design and measure 39.7 inches in length and 17.7 inches in diameter. Both will be FAA certified in 1961.

The CJ610-2B is also being used in studies by Israel Aircraft Industries as the powerplant for its B-101C executive jet.

Price of the CJ610 engines is lower than that of any comparable engines on the market.

The high performance CJ610 turbojet is one of the commercial derivatives of the proven military J85. With a history of nearly 30,000 test hours, the J85 has demonstrated versatility and reliability as the powerplant for Northrop's operational T-38 "Talon" trainer, McDonnell's GAM-72 "Quail" missile, now operational with the Strategic Air Command, Radioplane's Q4B supersonic target drone, and the experimental VTOL X-14A.

For additional information on the CJ-610 write for Bulletin GED-4451.1.

Convair 880: Three speed records, 1200-hou

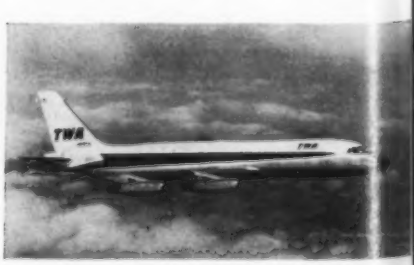
CINCINNATI, O.—The 615 mph Convair 880 jet airliner helped three airlines set commercial speed records during its first year of scheduled service ending May 15, 1961.

The first speed record was claimed by Delta Air Lines during delivery of their initial 880. The aircraft raced the 2359 miles from San Diego to Miami in 3 hours 31 minutes to set a southern transcontinental speed mark. Average speed was 655 mph.

Last fall, an 880 destined for Northeast Airlines cut the 2730-mile "corner to corner" transcontinental record from San Diego to Boston to 4 hours, 10 minutes.

Most recently, Trans World Airlines joined the record setters when an 880 Superjet Flight set a commercial record of 2 hours, 57 minutes for the 1920 miles between San Francisco and Chicago. Scheduled time: 3 hours, 35 minutes.

In another first year development, the FAA recently granted Delta Air Lines a 1200-hour Time Between Overhaul for the General Electric CJ-805-3 turbojet engines powering the Delta 880 fleet. The authorization also included a TBO of 1500 hours for engine accessories and controls. The increase



TWA 880 Superjet hit 720 mph to set 1920-mile San Francisco-Chicago speed mark.

30-Kw Plasmajet Engine Tested Successfully

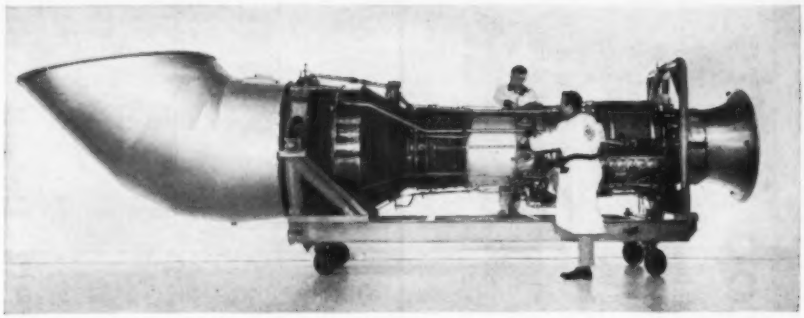
CINCINNATI, O.—A 30-Kw arc jet engine for space propulsion has successfully completed initial performance tests at General Electric's Flight Propulsion Laboratory.

Work on the engine is being performed for the National Aeronautics and Space Administration. This electric engine is designed to produce thrusts of the order of 0.5 lbs for extended periods of time, making it suitable for a number of functions in space.

Under another program—also being performed for NASA—General Electric is pinpointing the most attractive missions for this propulsion system, centering around lunar transfers, transfer to stationary satellite orbits and communication satellite installation functions. Power for this engine will be supplied by the SNAP VIII nuclear-turbogenerator system.

In principle, arc jets are similar to chemical rockets, except that the acceleration of mass is accomplished by an electrical energy input, rather than a chemical reaction. This allows the arc jet to operate at very high specific impulses, three to four times the value of chemical systems.

Because of its low propellant consumption, the electric power-propulsion system promises very significant increases in useful orbital payloads—with the boosters now under development.



Model 240 turboshaft is scheduled to power U.S. Maritime Administration 80-ton, 60-knot hydrofoil later this year. Dynamic Developments, Inc. is building the vessel.

Model 240 Engine Completes Tests; Goes to Grumman for MARAD Craft

CINCINNATI, O.—General Electric's Model 240 turboshaft engine, slated to power the U.S. Maritime Administration's 60-knot hydrofoil vessel in sea trials this summer, has completed qualification testing.

The engine produced over 18,000 shaft horsepower at 5500 rpm. All vibration levels were within design limits and turbine blade stresses were below limits for all normal operating conditions.

Following completion of the tests, the engine was shipped to Dynamic Developments, Inc., an affiliate of Grumman Aircraft Engineering Corp., at Babylon, N. Y. Dynamic Developments is under contract to deliver the 80-ton hydrofoil to MARAD this year.

G.E.'s Model 240 engine is part of a complete power package the Company is offering for marine propulsion. The package includes main powerplant, transmission, and docking engine.

The basic Model 240 engine is a turboshaft version of G.E.'s proven CJ-805 commercial turbojet. The basic engine weighs approximately 6600 pounds, only one-tenth as much as similarly rated reciprocating engines and steam propulsion systems.

General Electric's test facilities at Evendale, Ohio, where the Model 240 passed qualification, includes three water brakes capable of measuring 27,000 shaft horsepower. The Model 240 tests represented the first time such a system has been used with a large turboshaft engine.

engine TBO in first year

was granted in accordance with the FAA's Turbine Engine Time Control Program, which permits TBO extensions of 200 hours when engine shutdown rates of less than 1 per 10,000 flight hours are demonstrated.

Delta 880 averaged 655 mph, setting southern transcontinental speed record.

Northeast 880 cut "corner to corner" San Diego-Boston record to 4 hr, 10 min.

CJ-805-23C Certificated by FAA

CINCINNATI, O.—General Electric's CJ-805-23C aft-fan engine has been awarded Federal Aviation Type Certificate number 1E5.

The 16,100 pound thrust class CJ-805-23C will power the Sud Aviation Caravelle VII, scheduled to make its first flight in France late this year. General Electric has been flight testing a Caravelle with aft-fan engines installed since December, 1960.

FOR MORE INFORMATION

If you would like additional information on these G-E flight propulsion programs, write: General Electric Company, Section 206-28, Schenectady 5, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Year-end Adjustments Distort Turboprop Costs

The wide range of accounting practices that are used among airlines in computing their aircraft operating costs continues to show up in full bloom in the final quarter of each year.

As a result, the relatively steady trend in cost performance throughout the first three quarters is disturbed no end by the statistics compiled for October through December.

In turboprop operations among U.S. airlines, for example, costs rise or fall more as the result of accounting system influences than for any other reason.

In Lockheed Electra operations, for example, four airlines (Braniff, Eastern, National and Northwest) showed cost reductions in the last quarter over the third quarter and two (American and Western) had increases. Costs varied from a high of 264.3¢ per revenue mile for AA to 156.7¢ for WAL, a $1.08 spread.

In Vickers Viscount operations, Continental posted the industry low of 97.2¢ against 105.8¢ for Capital and 149.0¢ for Northwest. The latter, however, posted a remarkable 66.5% load factor for the Viscounts compared with 56.6% for Capital and 46.6% for CAL.

Allegheny Airlines' Convair 540 costs were up slightly from 96.0¢ in the third quarter to 98.6¢ in the final three months. During the period, Allegheny flew about 1300 hrs., realizing a utilization of 4:18 hrs. and a 37.9% load factor.

West Coast Airlines, with the aid of depreciation credits against reserves accumulated during the year, was low among the locals in F-27 costs at 78.5¢. Bonanza, which converted to an "all F-27" service midway during the period, also held costs below $1.00 per mile at 94.5¢. ■

1960 FOURTH QUARTER TURBOPROP OPERATING COSTS

COSTS IN CENTS PER REVENUE MILE

	LOCKHEED ELECTRA						VISCOUNT			CONVAIR 540	FAIRCHILD F-27				
	AA	BNF	EAL	NAL	NWA	WAL	CAP	CAL	NEA	AAA	BAL	OZA	PAC	PAI	WCA
Crew Salaries and Expenses	37.0¢	30.0¢	37.9¢	30.3¢	33.8¢	28.2¢	25.6¢	22.3¢	24.7¢	21.2¢	22.2¢	20.9¢	23.6¢	26.2¢	24.8¢
Fuel, Oil and Taxes	25.6	25.7	27.0	25.4	25.1	24.7	22.7	22.7	24.9	21.0	16.5	16.5	15.8	16.9	18.5
Insurance	1.9	8.3	7.7	10.7	14.1	7.3	2.5	3.2	5.3	9.2	5.9	7.1	6.5	5.8	4.7
Other	.3	.2	...	...	.5	...	...	...	...	2.4	.2	...	1.1	...	...
Total Flying Operations	64.8	64.2	72.6	66.4	73.5	60.2	50.8	48.2	54.9	53.8	44.8	44.5	47.0	48.9	48.0
Labor	15.6	14.6	6.9	10.0	16.7	5.0	10.4	8.0	15.0	8.1	8.1	13.8	8.9	8.4	7.4
Materials & Outside Repairs	50.0	99.2	16.3	19.9	44.2	36.2	9.3	11.3	20.6	22.5	19.8	15.0	26.6	25.6	12.4
Reserves	...	(42.4)	...	11.1	...	.6	...	.7	9.4	1.6	4.1	8.2	(—1.3)	4.6	9.3
Total Direct Maintenance	65.6	71.4	23.2	41.0	60.9	41.8	19.7	20.0	45.0	32.2	32.0	37.0	34.2	38.6	29.1
Maintenance Indirect	34.8	15.7	5.7	16.5	20.4	8.9	14.1	10.5	22.7	16.6	6.6	6.8	12.4	9.4	8.2
Total Maintenance	100.4	87.1	28.9	57.5	81.3	50.7	33.8	30.5	67.7	48.8	38.6	43.8	46.6	48.0	37.3
Depreciation															
Aircraft	33.3	30.0	34.3	34.8	19.9	24.6	14.5	11.1	13.3	12.6	6.2	6.8	9.6	7.6	(4.2)
Engines	...	8.1	12.5	9.2	5.8	...	3.2	4.0	8.3	4.7	2.5	2.6	3.3	2.3	(1.5)
Parts & Other	5.9	6.9	16.7	8.2	7.0	4.6	3.5	3.4	4.8	3.7	2.4	3.8	2.6	2.7	(1.1)
Total Depreciation	39.2	45.0	63.5	52.2	32.7	29.2	21.2	18.5	26.4	21.0	11.1	13.2	15.5	12.6	(6.8)
Aircraft & Engine Rentals	59.9	...	...	...	...	16.7	...	...	...	(25.0)	...	...	...	...	...
Total Aircraft Operating Exp.	264.3¢	196.3¢	165.0¢	176.1¢	187.5¢	156.7¢	105.8¢	97.2¢	149.0¢	98.6¢	94.5¢	101.5¢	109.1¢	109.5¢	78.5¢
Hours Flown—Revenue	17,112	3,289	22,679	6,269	5,684	4,175	42,778	8,965	6,054	1,299	4,836	1,731	3,087	4,358	4,223
Hours Flown—Training	202	60	508	131	60	51	422	140	303	170	126	7	85	43	63
Hours Flown—Other	208	64	329	17	44	71	253	38	48	39	55	10	34	42	47
Total Hours Flown	17,522	3,413	23,516	6,417	5,788	4,297	43,453	9,143	6,405	1,508	5,017	1,748	3,206	4,443	4,333
Revenue Utilization	5:28	4:47	6:19	5:41	6:52	8:15	8:33	7:38	6:35	4:18	6:34	6:16	5:36	6:00	7:39
Average Fleet Size	31.1	7.5	39.0	12.0	9.0	5.5	54.4	12.8	10.0	3.3	8.0	3.0	6.0	8.0	6.0
Revenue Aircraft Miles (000)	4,686	879	5,834	1,724	1,692	1,264	10,408	2,353	1,390	314	1,028	340	628	842	815
Passenger Load Factor—First Class	52.1%	46.3%	43.5%	29.6%	33.3%	50.1%	56.6%	44.6%	46.5%	37.9%	40.3%	44.2%	56.3%	44.4%	46.5%
Passenger Load Factor—Coach		70.7	49.1	59.6	64.4	70.2	48.8	...	47.0	...			47.8	...	...
Average Seats Per Mile	68.0	69.6	69.6	78.3	76.9	71.5	45.1	52.1	44.0	51.5	37.9	39.3	36.0	35.8	38.5
Average Passengers Per Mile	35.3	36.4	31.4	31.6	39.4	41.9	25.1	23.1	28.8	19.5	15.3	17.4	19.0	15.8	17.6
Cost Per Seat Mile	3.89¢	2.82¢	2.37¢	2.25¢	2.44¢	2.19¢	2.35¢	1.87¢	3.39¢	1.98¢	2.49¢	2.59¢	3.03¢	3.06¢	2.04¢
Cost Per Passenger Mile	7.48	5.39	5.26	5.57	4.77	3.73	4.22	4.21	5.18	5.23	6.18	5.83	5.75	6.93	4.47
Average Flight Length—Miles	366	286	312	328	312	625	292	207	231	203	132	113	128	81	118
Average Speed Airborne—MPH	273	267	257	275	297	302	242	262	230	242	213	196	203	193	192
Average Speed Block-to-Block	237	236	221	243	270	256	210	230	194	201	186	164	177	162	162
Fuel Consumed—Gals. Per Hour	648	701	674	646	656	615	477	506	537	399	260	268	273	267	261
Oil Consumed—Gals. Per Hour	.3	...	.2	.3	.1	...	.1	...	...	.1	.1	...	.2	.1	...

Reserve Credits Dip Year-end Jet Costs

Year-end adjustments to reserve accounts tended to color the direct operating costs of U.S. airline turbines during the last three months of 1960.

Despite slight declines in utilization for many carriers, credits to various operating accounts reduced costs well below levels reported in the past.

In Boeing 707 operations, American Airlines' deficit entry under depreciation gave it the lowest total direct operating expense for the industry at 119.2¢ per revenue plane-mile. Continental, which has led the industry in low-cost jet performance, was down from 157.8¢ in the third quarter to 134.6¢ for the final three months.

In other services, United's DC-8 moved to the top of the list of all U.S. carriers compiling 19,857 hrs. of operation. Nearest to this was American's 19,327 hrs. accumulated on 707-123s.

UAL's DC-8 costs were 194.9¢ per revenue mile, whereas those of National (202.4¢) and EAL (208.5¢) were slightly higher. Delta's declined slightly from 253.2¢ in the third quarter to 251.7¢, but were still considerably above other DC-8 operators. Northwest, hit by a labor shutdown during the period, understandably showed a high cost pattern.

In average jet speeds, TWA's Intercontinental 707 used in domestic service continued to lead the industry with an average 504 mph airborne speed.

In DC-8 services, NAL averaged 490 mph for a 1583 mile stage, Eastern 485 mph for a 1077 mile average flight length and United 474 mph over an 1193 mile segment. Both NAL and EAL use JT4 powered DC-8s and UAL uses JT3s. Delta, with the lowest flight stage (812 miles) averaged 432 mph. ■

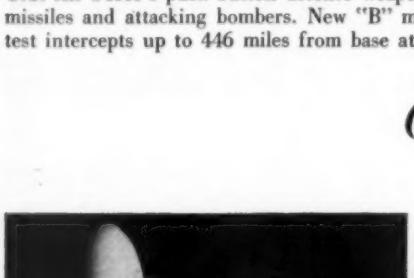
1960 FOURTH QUARTER JET OPERATING COSTS

COSTS IN CENTS PER REVENUE MILE

	DOUGLAS DC-8					CV-880		BOEING 707							
	DAL	EAL	NAL	NWA	UAL	DAL	NEA	AA 707-123	AA 720	BNF 707	CAL 707-100	TWA 707-131	TWA 707-320	UAL 720	WAL 707
Crew Salaries and Expenses	22.1¢	26.6¢	20.6¢	32.5¢	27.3¢	23.1¢	60.8¢	25.4¢	26.1¢	22.5¢	23.5¢	27.5¢	26.0¢	25.4¢	30.2¢
Fuel, Oil and Taxes	61.7	56.1	52.0	77.6	56.3	49.3	54.6	50.8	53.6	55.2	51.1	49.2	57.5	54.8	58.0
Insurance	18.2	19.3	18.3	92.1	12.4	21.3	15.1	(.1)	11.3	23.3	16.1	(18.0)	(1.7)	10.6	23.3
Other	.2	...	.3	...	.4	...	...	.2	.2	...	...	.3	.3	.4	...
Total Flying Operations	102.2	102.0	91.2	202.2	96.4	93.7	130.5	76.3	91.2	101.0	90.7	59.0	82.1	91.2	111.5
Labor	18.5	13.9	12.7	10.8	14.9	14.6	31.9	11.1	6.5	9.0	9.2	15.6	5.0	11.2	7.1
Materials & Outside Repairs	37.6	22.2	18.4	79.4	19.1	11.1	8.8	15.9	7.3	44.9	24.3	36.2	16.0	18.9	42.5
Reserves	...	...	9.9	...	...	10.5	27.1	...	...	...	(26.2)	(9.2)	...	...	(14.4)
Total Direct Maintenance	56.1	36.1	41.0	90.2	34.0	362	67.8	27.0	13.8	53.9	7.3	42.6	21.0	30.1	35.2
Maintenance Indirect	36.1	11.5	21.1	12.6	28.5	25.8	71.7	24.5	14.4	9.6	12.5	30.1	9.6	21.4	8.4
Total Maintenance	92.2	47.6	62.1	102.8	62.5	62.8	139.5	51.5	28.2	63.5	19.8	72.7	30.6	51.5	43.6
Depreciation															
Aircraft	28.7	33.8	25.8	259.9	28.4	26.9	...	5.2	16.4	29.6	16.9	4.6	27.5	31.0	...
Engines	19.7	10.7	17.0	75.8	5.4	11.9	...	(148)	...	8.8	3.7	6.1	13.4	11.5	...
Parts & Other	9.0	14.4	6.3	66.8	2.2	5.8	...	1.0	4.6	5.3	3.5	5.9	5.4	2.2	18.6
Total Depreciation	57.4	58.9	49.1	402.5	36.0	44.6	...	(8.6)	21.0	43.7	24.1	16.6	46.3	44.7	18.6
Aircraft & Engine Rentals	...	...	...	...	...	1.8	52.9	...	12.2	...	...	55.0	...	...	90.6
Total Aircraft Operating Exp.	251.7¢	208.5¢	202.4¢	707.5¢	194.9¢	202.1¢	322.9¢	119.2¢	152.6¢	208.2¢	134.6¢	203.3¢	159.0¢	187.4¢	264.3¢
Hours Flown—Revenue	3,017	5,120	1,564	113	18,828	3,484	202	18,338	5,731	1,848	4,751	11,252	3,466	5,677	1,294
Hours Flown—Training	152	855	134	299	829	379	116	907	167	18	69	166	244	657	...
Hours Flown—Other	13	58	2	16	200	62	...	82	37	19	5	70	15	79	4
Total Hours Flown	3,182	6,033	1,700	428	19,857	3,925	318	19,327	5,935	1,885	4,825	11,488	3,725	6,413	1,298
Revenue Utilization	7:38	6:31	6:23	1:19	7:30	5:27	2:58	8:42	7:18	7:05	10:58	8:11	8:14	5:36	7:02
Average Fleet Size	4.3	8.6	2.7	.9	27.4	7.0	.8	23.2	8.5	3.1	5.0	15.0	4.6	11.1	2.0
Revenue Aircraft Miles (000)	1,304	2,375	758	55	8,921	1,611	84	8,855	2,706	871	2,266	5,322	1,749	2,513	537
Passenger Load Factor—First Class	69.2%	70.0%	58.8%	59.5%	56.7%	65.3%	38.1%	61.8%	66.6%	62.6%	40.8%	52.3%	50.5%	67.6%	56.7%
Passenger Load Factor—Coach	66.9	62.0	70.4	56.9	70.8	55.2	54.3	64.5	78.0	70.2	51.5	67.1	53.7	77.9	68.4
Average Seats Per Mile	117.2	115.8	126.1	120.0	112.7	81.1	97.2	117.8	98.7	106.0	111.3	115.7	122.3	104.0	111.5
Average Passengers Per Mile	79.3	73.8	87.5	69.5	73.2	51.7	43.3	74.8	75.6	70.7	52.9	71.1	64.3	76.4	71.5
Cost Per Seat Mile	2.15¢	1.80¢	1.61¢	5.90¢	1.73¢	2.49¢	3.32¢	1.01¢	1.55¢	1.96¢	1.21¢	1.76¢	1.30¢	1.80¢	2.37¢
Cost Per Passenger Mile	3.17	2.83	2.31	10.1:8	2.66	3.91	7.46	1.59	2.02	2.95	2.54	2.86	2.47	2.45	3.70
Average Flight Length—Miles	812	543.6	1,077	1,583	1,193	691	875	1,553	924	744	1,113	1,306	1,819	587	595
Average Speed Airborne—MPH	432	464	485	490	474	462	417	483	472	471	476	473	504	442	415
Average Speed Block-to-Block	381	411	435	437	430	397	370	446	419	420	446	436	467	380	374
Fuel Consumed—Gals. Per Hour	2,325	2,449	2,831	2,682	2,402	2,160	...	2,345	2,393	2,774	2,277	2352	2382	2268	2298
Oil Consumed—Gals. Per Hour	...	.2	.4	.2	.3	...	...	.3	.2	...	...	.2	.2	.2	...

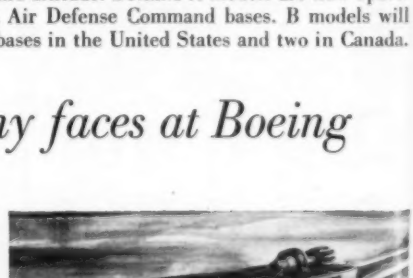
AUTOMATIC SKY FIGHTER. Supersonic Boeing BOMARC is U.S. Air Force's push-button defense weapon against airborne missiles and attacking bombers. New "B" models have scored test intercepts up to 446 miles from base at altitudes of more than 100,000 feet, establishing new surface-to-air defense missile records for range and altitude. BOMARC A models are now operational at five U.S. Air Defense Command bases. B models will be installed at six bases in the United States and two in Canada.

Capability has many faces at Boeing



WIND SONDE, developed by Boeing subsidiary, Allied Research Associates, will measure wind direction and velocity at wide range of altitudes, telemetering data back for instant use at missile launch ranges, other weather stations.

SPACEMAN'S BLAST-OFF. Boeing Space Medicine researcher prepares for simulated blast-off, wearing belt of Boeing-developed miniature electronic instruments which measure reactions to stresses imposed by take-off of space vehicles.



JET-PROPELLED TEST BOAT, now being built for Boeing, will be used to test experimental surface and subsurface marine vehicle designs at speeds up to 100 knots. Test models will be suspended between two forward hulls. Test boat will supplement Boeing tow-tank research in advancing knowledge in area of hydrodynamics.

BOEING

1960 Airline Executive Salaries

TRUNKS AND INTERNATIONAL

AMERICAN AIRLINES

OFFICERS: **C. R. Smith**, pres. & director, $85,000 salary, 25,000 shares; **Wm. J. Hogan**, exec. v.p., chairman of finance com. & director, $71,389 salary, 500 shares; **O. M. Mosier**, exec. v.p. & dir., $70,000 salary, 3,000 shares; **G. A. Spater**, exec. v.p. & gen. counsel, $60,000 salary, 500 shares; **C. W. Jacob**, sr. v.p. & secy., $65,000 salary, 4,000 shares; **G. M. Sadler**, v.p. & gen. mgr., $50,000 salary; **A. R. Bone Jr.**, v.p., $35,000 salary, 2,000 shares; **M. A. Brenner**, v.p., $25,000 salary, 155 shares; **W. G. Conrad**, v.p.* (1/20/60), $19,868 salary, 200 shares; **G. E. Coon**, v.p.* (1/20/60), $20,089 salary, 200 shares; **W. B. Davis**, v.p.* (1/20/60) $28,750 salary; **R. L. Fitzpatrick**, v.p., $40,000 salary; **L. E. Glasgow**, v.p. & controller, $42,500 salary, 600 shares; **R. A. Goebel**, v.p., $27,500 salary; **G. P. Hitchings**, v.p.* (4/16/60), $24,792 salary; **L. J. Hunt**, v.p.* (1/20/60), $28,750 salary; **P. W. Kayser**, v.p. $45,000 salary, 400 shares; **M. D. Kochman**, v.p., $35,000 salary; **R. F. Lambert**, v.p., $19,894 salary, 300 shares; **J. J. Lamond**, v.p.* (1/20/60), $20,089 salary; **W. C. Lawrence**, v.p., $27,894 salary, 680 shares; **Wm. Littlewood**, v.p., $35,000 salary, 1,880 shares; **W. H. Miller**, v.p.* (1/20/60), $25,315 salary, 1,970 shares; **A. J. Moccia**, v.p. & asst. treas., $25,549 salary; **F. J. Mullins**, v.p., $30,000 salary, 400 shares; **C. N. Oursler**, v.p., $33,071 salary, 200 shares; **Willis Player**, v.p., $40,000 salary, 800 shares; **G. W. Shiles**, v.p.* (1/20/60), $18,063 salary; **N. L. Smith**, v.p., $30,000 salary, 10 shares; **C. R. Speers**, v.p., $40,000 salary, 3,200 shares; **C. H. Startup**, v.p., $30,000 salary; **D. D. Taylor**, v.p., $25,000 salary; **E. C. Taylor**, v.p., $35,000 salary, 200 shares; **W. B. Whitacre**, v.p., $38,097 salary; **W. G. Whitney**, v.p., $25,000 salary, 410 shares; **F. C. Wiser**, v.p., $40,000 salary, 350 shares; **P. G. Larie**, treas., $24,000 salary; **M. G. Beard**, asst. v.p., $25,000 salary, 2,500 shares; **W. W. Braznell**, asst. v.p., $34,000 salary; **A. Di Pasquale**, asst. v.p., $25,000 salary; **W. H. Hall**, asst. v.p.* (7/20/60), $21,594 salary; **T. F. Holden**, asst. v.p., $20,000 salary; **J. D. Hungerford**, asst. v.p., $25,000 salary, 550 shares; **J. K. Kilcarr**, asst. v.p. & asst. treas., $20,978 salary; **F. W. Kolk**, asst. v.p.* (7/20/60) $22,679 salary; **V. J. Long**, asst. v.p., $23,000 salary, 200 shares; **M. L. Muse**, asst. v.p.* (10/1/60), $5,625 salary; **D. F. O'Donoghue**, asst. v.p., $27,500 salary; **W. F. Prigge**, asst. v.p., $25,000 salary, 150 shares; **H. Don Reynolds**, asst. v.p., $25,000 salary, 100 shares; **Morris Shipley**, asst. v. p., $24,000 salary, 400 shares; **A. E. Smick**, asst. v.p., $23,000 salary, 40 shares; **W. D. Stewart**, asst. v.p.* (5/18/60), $21,474 salary; **R. B. Wyland**, asst. v.p., $20,894 salary; **W. J. Corbett**, asst. controller, $20,000 salary; **J. V. Dooley**, asst. controller, $23,000 salary; **J. T. Slavin**, asst. treas. & asst. secy., $10,000 salary; **A. A. Paradis**, asst. secy., $19,429 salary.

BRANIFF AIRWAYS

OFFICERS: **Charles E. Beard**, pres. & dir., $72,000 salary, $5,248 expenses, 21,600 shares; **J. W. Miller**, exec. v.p. & dir., $47,500 salary, $2,285 expenses, 1,106 shares; **Rex Brock**, sr. v.p. & dir., $33,750 salary, $3,948 expenses, 300 shares; **R. V. Carleton**, sr. v.p. & dir., $39,300 salary, $2,450 expenses, 4000 shares; **C. G. Adams**, v.p., secy. & dir., $33,000 salary, $721 expenses, 6,759 shares; **F. J. Baisecker**, v.p.-financial serv., $16,650 salary, $300 expenses; **Horace Bolding**, v.p.-purchasing & stores, $19,500 salary, $434 expenses, 4 shares; **R. H. Burck**, v.p.-traffic & sales, $15,900 salary, $3,570 expenses, 100 shares; **Malcolm Harrison**, v.p.-ind. relations, $24,900 salary, $866 expenses; **Walter Henshel**, v.p.-pub. rel., $22,900 salary, $2,248 expenses; **J. R. Horton**, v.p.-maint. & engr., $18,900 salary, $565 expenses; **Dan Hughes**, v.p.-operations, $29,880 salary, $774 expenses; **Tom Robertson**, v.p.-economic planning, $19,500 salary, $1,197 expenses; **R. C. Shrader**, v.p. & dir., $18,000 salary, 1,200 shares; **Charles S. Smith**, v.p., $23,000 salary, $6,571 expenses; **Oscar Ozana**, treas., $15,900 salary, $628 expenses, 213 shares; **R. L. Barrier**, asst. v.p.-budgets, $13,500 salary; **Roland Frost**, asst. v.p.-properties, $10,725 salary, $1,789 expenses; **V. A. Kropff**, asst. v.p.-spec. projects, $13,800 salary, $1,525 expenses; **Jack Say**, asst. v.p.-ground operations, $12,990 salary, $0 expenses, 242 shares; **Jake Serlie**, asst. v.p.-flight dispatch, $13,800 salary, $38 expenses; **Loyd Allen**, asst. treas., $13,050 salary, $274 expenses; **Anita Bowlware**, asst. secy., $5,700 salary, 40 shares.

CAPITAL AIRLINES

OFFICERS: **David H. Baker**, pres. & dir., $56,000 salary, $4,293 expenses, 300 shares; **Walter H. Johnson**,** sr. v.p. & dir., $36,987 salary, $7,808 expenses, 100 shares; **B. G. Lochiel**, sr. v.p. & dir., $32,666 salary, $1,613 expenses, 4,000 shares; **Marvin Whitlock**, sr. v.p. $29,306 salary, $619 expenses; **R. J. Wilson**, v.p. $25,013 salary, $1,415 expenses, 198 shares; **Hayes Dever**, v.p. & secy., $19,786 salary, $2,558 expenses, 900 shares; **R. O. Chalfant**, v.p., $16,333 salary, $2,681 expenses, 3 shares; **G. Ward Hobbs**, v.p. (resigned 9/15/60), $18,356 salary, $1,441 expenses; **John G. Mahoney**, v.p. (resigned 11/14/60), $17,916 salary, $4,304 expenses; **R. W. Hardesty**, v.p., $19,196 salary, $812 expenses, 100 shares; **Earl Raymond**, asst. v.p., $14,371 salary, $277 expenses; **S. T. McAlister**, asst. v.p., $14,840 salary, $951 expenses; **Althea M. Gould**, asst. v.p., $13,066 salary, $2,021 expenses, 36 shares; **O'Ferrell Estes**, asst. treas., $14,000 salary, $527 expenses; **Waller B. Smith**, asst. secy., $10,412 salary, $444 expenses; **J. B. Franklin**, sr. v.p. (resigned 6/1/60), $19,886 salary, $355 expenses; **A. H. Norling**, sr. v.p. (resigned 8/12/60), $11,946 salary, $521 expenses; **J. B. Andersen**, asst. v.p. (entered office in June, resigned 8/15/60), $10,448 salary, $1,002 expenses.

** Walter H. Johnson resigned as sr. v.p. 10/15/60.
* Date entered office.
Notes: American and United will report expenses borne by carrier in a separate filing.

CONTINENTAL AIR LINES

OFFICERS: **R. F. Six**, pres. & dir., $68,333 salary, $32,604 expenses, 5,250 shares; **H. L. Lawrence**, exec. v.p. & dir., $36,807 salary, $3,456 expenses, 1,125 shares; **A. Damm**, v.p.-finance, $28,333 salary, $9,040 expenses; **H. W. Bell, Jr.**, v.p.-personnel, $18,100 salary, $5,520 expenses, 161 shares (joint tenancy); **C. A. Bucks**, asst. v.p.-sales (*5/1/60), $10,000 salary, $3,742 expenses; **H. H. Cady**, asst. v.p. & treas., $14,333 salary, $307 expenses; **C. H. Calhoun**, v.p.-engr. & maint., $22,073 salary, $3,056 expenses, 210 shares; **F. G. Colner**, asst. v.p. & budget director, $13,253 salary, $2,234 expenses, 63 shares; **M. L. Davis**, v.p.-sales, $19,667 salary, $2,478 expenses, 50 shares; **O. R. Haueter**, v.p.-operations, $27,000 salary, $3,424 expenses, 2,172 shares (joint tenancy); **G. J. M. Kelly**, secy., $12,500 salary, $776 expenses, 855 shares; **B. King**, asst. v.p.-publicity (*5/1/60), $10,667 salary, $1,049 expenses, 1,000 shares; **M. Kramer**, v.p.-customer service planning, $19,553 salary, $3,501 expenses, 1,475 shares; **P. F. Kriethe**, asst. secy., $12,800 salary, $1,470 expenses, 5 shares; **E. B. Ranes**, v.p.-customer field service, $17,140 salary, $2,708 expenses; **S. B. Redmond**, v.p.-reg. proc., $17,953 salary, $2,681 expenses, 1,243 shares; **R. G. Schorling**, asst. v.p.-purchasing, $15,720 salary, $2,400 expenses, 168 shares; **C. F. Whelan**, v.p.-economic planning, $19,667 salary, $1,143 expenses; **D. R. Wilson**, v.p.-flight, $19,765 salary, $1,724 expenses; **L. H. Dennis**, v.p.-customer service planning (**1/15/60), $843 salary, 945 shares.

* date entered office. ** term expired.

DELTA AIR LINES

OFFICERS: **C. E. Woolman**, pres., gen. mgr. & dir., $60,000 salary, $3,260 expenses, 41,196 shares; **Todd G. Cole**, exec. v.p.-adm., asst. secy. & dir., $36,000 salary, $476 expenses, 841 shares; **Charles H. Dolson**, exec. v.p.-operations & dir., $36,000 salary, $1,026 expenses, 1,625 shares; **R. S. Maurer**, v.p.-legal & dir., $23,750 salary, $2,329 expenses, 113 shares; **W. T. Beebe**, v.p.-personnel, $25,000 salary, $842 expenses, 187 shares; **Erle Cocke, Jr.**, v.p.-civic affairs, $19,400 salary, $4,008 expenses, 1,700 shares; **T. M. Miller**, v.p.-traffic & sales, $25,000 salary, $2,426 expenses, 70 shares; **Robert L. Griffin**, v.p., $20,417 salary, $4,508 expenses, 100 shares; **Robert Oppenlander**, comptroller & treas., $19,200 salary, $300 expenses; **R. H. Wharton**, asst. v.p.-personnel, $16,000 salary, $602 expenses, 250 shares; **C. H. McHenry**, secy.-treas., $250 salary, $95 expenses, 1,875 shares; **Catharine FitzGerald**, asst. treas., $7,000 salary, 4,225 shares; **H. H. Saxon**, asst. treas, $12,000 salary, $165 expenses; **J. R. Howell**, asst. treas., $12,000 salary, $46 expenses; **C. B. Wilder**, asst. v.p.-operations-technical, $18,500 salary, $202 expenses, 150 shares; **Paul W. Pate**, asst. v.p.-properties, $14,400 salary, $2,309 expenses, 100 shares; **Charles P. Knecht**, asst. v.p.-sales, $14,400 salary, $695 expenses, 272 shares.

EASTERN AIR LINES

OFFICERS: **E. V. Rickenbacker**, Chm. of Board, $50,000 salary, $900 bonus & indir. comp., $7,649 expenses, 54,649 shares; **M. A. MacIntyre**, pres. & dir., $80,000 salary, $900 bonus & indir. comp., $5,269 expenses, 102 shares; **T. F. Armstrong**, exec. v.p. & dir., $35,000 salary, $900 bonus & indir. comp., $2,851 expenses, 6,337 shares; **T. E. Craighton**, treas. & dir., $19,792 salary, $600 bonus & indir. comp., $400 expenses, 4,850 shares; **M. M. Frost**, v.p., $28,600 salary, $8,488 expenses, 2,650 shares; **William Van Dusen**, v.p., $26,375 salary, $4,263 expenses, 3,316 shares; **Charles Froesch**, v.p., $23,542 salary, $2,634 expenses, 2,620 shares; **J. H. Brock**, v.p., $24,417 salary, $4,005 expenses, 2,165 shares; **M. Lethbridge**, v.p., $18,834 salary, $1,562 expenses, 553 shares; **W. L. Morrisette, Jr.**, v.p., $24,792 salary, $3,605 expenses, 454 shares; **R. L. Turner**, v.p.* (3/1/60), $25,792 salary, $6,253 expenses, 102 shares; **R. Ramspeck**, v.p., $20,000 salary, $3,610 expenses, 770 shares; **A. L. Chabot**, v.p., $26,250 salary, $5,427 expenses, 1,062 shares; **G. A. Smith**, v.p., $25,000 salary, $4,534 expenses, 3,331 shares; **J. H. Halliburton**, v.p., $30,125 salary, $3,332 expenses, 686 shares; **R. S. Lipp**, secy., $13,950 salary, $424 expenses, 301 shares; **C. R. Springer**, deputy v.p.* (9/1/60), $11,898 salary, $1,179 expenses; **R. F. Moore**, deputy v.p.* (8/15/60), $8,063 salary, $1,694 expenses; **M. B. Westphal**, asst. v.p., $18,309 salary, $2,929 expenses, 160 shares; **H. W. Cutshall**, asst. v.p., $13,375 salary, $3,209 expenses, 11 shares; **F. Sharpe**, asst. v.p., $19,121 salary, $2,914 expenses, 569 shares; **R. E. Baskind**, asst. v.p., $15,000 salary, $3,205 expenses; 167 shares; **M. O. Byrd**, asst. v.p., $14,890 salary, $2,943 expenses, 55 shares; **L. O. Cameron**, asst. v.p.* (2/26/60), $15,069 salary, $1,175 expenses, 823 shares; **G. W. Chappell**, asst. v.p., $14,875 salary, $3,826 expenses; **P. L. Foster**, asst. v.p., $28,640 salary, $1,022 expenses, 203 shares; **W. C. Gilbert**, asst. v.p.* (1/29/60), $15,209 salary, $1,295 expenses, 663 shares; **C. A. Glover**, asst. v.p., $15,000 salary, $4,729 expenses, 423 shares; **B. Griffith**, asst. v.p., $9,317 salary, $2,094 expenses; **J. A. Hamill**, asst. v.p., $12,000 salary, $323 expenses, 15 shares; **J. T. Hoffman, Jr.**, asst. v.p., $12,309 salary, $4,075 expenses, 116 shares; **J. O. Jarrard**, asst. v.p.* (1/25/60), $19,802 salary, $1,657 expenses; **H. Knapp**, asst. v.p., $12,000 salary, $3,557 expenses, 355 shares; **D. C. McRae**, asst. v.p., $16,804 salary, $1,351 expenses, 742 shares; **J. E. Reinke**, asst. v.p., $14,550 salary, $3,682 expenses, 103 shares; **D. L. Sinkler**, asst. v.p., $13,700 salary, $4,484 expenses, 570 shares; **T. A. Sundem**, asst. v.p., $14,750 salary, $3,519 expenses, 32 shares; **A. F. Tirrell**, asst. v.p., $12,317 salary, $3,785 expenses, 195 shares; **E. L. Williams**, asst. v.p., $12,500 salary, $6,107 expenses, 223 shares; **F. E. Williams**, asst. v.p., $15,017 salary, $4,776 expenses, 378 shares; **W. T. Raymond**, asst. v.p., $14,375 salary, $11,575 expenses; **H. G. Dobbs**, asst. v.p., $12,000 salary, $1,307 expenses, 301 shares; **E. E. Hahn**, asst. treas., $13,550 salary, $1,087 expenses, 157 shares; **C. J. Simons**, asst. treas., $13,392 salary, $2,382 expenses, 234 shares; **J. C. Warlick**, asst. secy., $10,550 salary, $664 expenses, 459 shares; **C. A. Wallen**, asst. secy., $12,892 salary, $983 expenses, 306 shares.

MACKEY AIRLINES

OFFICERS: **Joseph C. Mackey**, pres., $18,750 salary, $3,098 expenses, 115,734 shares; **John H. Popham**, v.p., secy.-treas. & dir., $14,500 salary, $282 expenses, 10,001 shares; **Henry H. Johnson**, v.p.-traffic & sales, $9,975 salary, $2,149 expenses, 1,342 shares; **Robert C. Tischler**, v.p.-operations, $14,500 salary, 10,148 shares.

NATIONAL AIRLINES

OFFICERS: **G. T. Baker**, pres. & dir., $60,000 salary, $12,557 expenses, 169,973 shares; **J. C. Brawner**, exec. v.p. & dir., $30,000 salary, $1,088 expenses, 3,992 shares; **W. B. Caldwell, Jr.**, asst. treas., $12,000 salary, $716 expenses, 78 shares; **J. W. Colthar**, asst. v.p., $15,000 salary; **R. Drake**, treas., $12,000 salary, $189 expenses; **L. W. Dymond**, v.p., $24,000 salary, $1,068 expenses, 659 shares; **R. A. Fitzgerald**, v.p., $15,000 salary, $1,444 expenses, 136 shares; **R. P. Foreman**, secy. & dir., (**2/29/60), $2,500 salary, $30 expenses; **R. S. Grant**, asst. v.p., $15,000 salary, $451 expenses, 102 shares; **A. G. Hardy**, sr. v.p., $24,000 salary, $3,699 expenses, 2,755 shares; **W. F. Johnston**, v.p., $18,000 salary, $641 expenses, 2,996 shares; **John L. Morris**, $18,000 salary, $4,470 expenses, 3,957 shares; **G. W. Paul**, asst. v.p., $10,583 salary, $663 expenses, 3 shares; **J. M. Rosenthal**, sr. v.p., $24,000 salary, $648 expenses, 2,922 shares; **C. F. Sharp**, v.p., $18,000 salary, $2,473 expenses, 1,301 shares; **J. D. Bassage**, v.p., (**1/20/60), $1,075 salary; **H. B. Taylor**, asst. treas., $10,000 salary, $1,503 expenses; **R. E. Wieland**, v.p., $18,000 salary, $3,829 expenses, 4,087 shares; **A. L. Stanley**, asst. v.p., $9,000 salary, $248 expenses, 106 shares; **N. M. Paquette**, asst. corporate secy. (*2/6/60), $5,811 salary, $29 expenses.

* date entered office. ** term expired.

Continued on page 41

THE NEW 707 ASTROJET* JET AGE: STAGE II

Now offered in regular transcontinental passenger service, American Airlines' new 707 Astrojet brings you a new standard of jet performance by the airline that's *first choice of experienced travelers.*

Powered by revolutionary new Jet-Fan engines, the 707 Astrojet greatly outperforms all other airliners. It takes off more quickly, uses far less runway than the best of standard jets. Aboard it, you experience a wonderful feeling of confidence as the Astrojet climbs swiftly to cruise easily, smoothly, within the transonic range—faster than any other jetliner in the world.

In keeping with its 25-year tradition of leadership, American is proud to be first in bringing you this new dimension in jets—this historic new era in air travel.

AMERICAN AIRLINES
America's Leading Airline

*Service mark of American Airlines, Inc.

Continued from page 39

NORTHEAST AIRLINES

OFFICERS: **James W. Austin**, pres. $36,000 salary, $5,182 expenses, 200 shares; **Joel S. Daniels**, asst. v.p.-adv. prom., $14,400 salary, $1,309 expenses, 200 shares; **Nelson B. Fry**, v.p.-traffic & sales (*2/29/60), $4,179 salary, $811 expenses; **George E. Gardner**, asst. to board, $21,000 salary, 100 shares; **Thomas L. Grace**, v.p.-operations, $25,000 salary, $1,574 expenses; **Hamilton Heard**, v.p.-adm., $15,000 salary, $520 expenses; **Rembrandt P. Lane, Jr.**, v.p.-finance & treas., $20,000 salary, $2,026 expenses; **Wheaton W. Mies**, asst. v.p.-prod., $12,000 salary, $321 expenses, 100 shares; **Magruder W. Offutt III**, asst. v.p.-general sales mgr., $16,881 salary, $3,024 expenses; **Edmund O. Schroeder**, v.p.-technical services, $25,000 salary, $585 expenses, 200 shares; **Alfred S. Walker, Jr.**, v.p.-ground operations, $14,400 salary; **Harry F. Zimmerman**, asst. treas., $14,000 salary, $176 expenses.

* date entered office. ** term expired.

NORTHWEST AIRLINES

OFFICERS: **Donald W. Nyrop**, pres. & dir., $75,000 salary, $7,253 expenses, 14,900 shares; **Frank C. Judd**, v.p.-maintenance & station operations, $33,000 salary, $3,670 expenses, 1,005 shares; **Emory T. Nunneley Jr.**, v.p. & gen. counsel (**9/26/60), $7,125 salary, $742 expenses; **Paul L. Benscoter**, v.p.-Orient, $20,200 salary, $2,201 expenses, 200 shares; **C. L. Stewart**, v.p.-plans, $19,000 salary, $3,319 expenses, 500 shares; **A. E. Floan**, v.p. & sec., $22,000 salary, $1,067 expenses, 5 shares; **D. H. Hardesty**, treas. (*5/16/60), $16,062 salary, $703 expenses, 710 shares; **M. J. Lapensky**, comptroller (*6/27/60), $7,667 salary, $71 expenses; **F. J. Scott**, asst. secy., $12,750 salary, $339 expenses; **Dale Merrick**, asst. v.p.-properties, $14,500 salary, $145 expenses, 200 shares; **R. A. Ebert**, v.p.-personnel (*5/16/60), $10,000 salary, $394 expenses, 20 shares common, 7 shares 5¼% pref.; **Gordon M. Bain**, v.p.-sales (**8/16/60), $34,466 salary, $825 expenses; **Wm. J. Eiden**, treas. (**11/30/60), $10,500 salary, $203 expenses; **A. D. Piepgras**, asst. comptroller (**7/22/60), $13,857 salary, $116 expenses.

* date entered office. ** date retired.

PANAGRA

OFFICERS: **Andrew B. Shea**, pres. & dir., $2,510 expenses; **Erwin Balluder**, v.p. & dir.; **Edward L. Farrell, Jr.**, v.p. & dir., $846 expenses; **Douglas Campbell**, v.p. & gen. mgr., $26,500 salary, $4,000 bonus & indir. comp., $3,809 expenses; **I. J. Kirkland**, v.p., $26,500 salary, $3,500 bonus & indir. comp., $4,468 expenses; **L. H. Clifton**, v.p. & comptroller, $22,500 salary, $1,800 bonus & indir. comp., $2,462 expenses; **C. S. Collins**, v.p., $19,500 salary, $1,500 bonus & indir. comp., $4,365 expenses; **J. T. Scholtz**, asst. v.p., $19,000 salary, $800 bonus & indir. comp., $1,308 expenses; **Ramon De Murais**, asst. v.p., $14,625 salary, $550 bonus & indir. comp., $4,343 expenses; **Roger V. Rowe**, asst. v.p., $2,764 expenses; **Gail M. Oxley**, secy.; **J. S. Woodbridge**, treas.; **H. Preston Morris**, asst. secy. (**8/1/60); **Josiah Macy, Jr.**, asst. secy. (*8/1/60); **A. J. Phelan**, asst. comptroller, $15,500 salary, $650 bonus & indir. comp., $619 expenses; **W. F. Lewis**, asst. treas., $14,000 salary, $400 bonus & indir. comp., $1,001 expenses; **E. F. Spencer**, asst. treas., $12,500 salary, $400 bonus & indir. comp., $8,865 expenses.

* date entered office. ** term expired.

PAN AMERICAN WORLD AIRWAYS

OFFICERS: **J. T. Trippe**, pres. & dir., $100,000 salary, $2,200 bonus & indir. comp., $5,441 expenses; **Roger Lewis**, exec. v.p.-adm. & dir., $40,000 salary, $31,600 bonus & indir. comp. $7,336 expenses; 5,825 shares; **W. L. Morrison**, exec. v.p.-LAD & dir. (*4/20/60), $40,000 salary, $27,800 bonus & indir. comp., $11,088 expenses, 17,462 shares; **H. E. Gray**, exec. v.p.-OD & dir., $40,000 salary, $31,200 bonus & indir. comp., $3,109 expenses, 10,927 shares; **R. B. Murray Jr.**, exec. v.p., $30,000 salary, $15,000 bonus & indir. comp., $15,818 expenses, 375 shares; **J. C. Leslie**, v.p., asst. to pres. & dir., $38,000 salary, $26,100 bonus & indir. comp., $2,478 expenses; **H. A. Schneider**, v.p., gen. counsel & dir., $36,000 salary, $3,300 bonus & indir. comp. $4,882 expenses; 250 shares; **S. F. Prior**, v.p. & dir., $33,000 salary, $16,950 bonus & indir. comp., $28,019 expenses, 14,500 shares; **F. Gledhill**, v.p. & dir., $38,000 salary, $27,200 bonus & indir. comp., $4,439 expenses, 5,202 shares; **W. G. Lipscomb**, v.p.-traffic & sales & dir. (*5/5/60), $38,000 salary, $28,600 bonus indir. comp., $7,344 expenses, 13,408 shares; **J. B. Gates**, v.p.-develop., $33,000 salary, $14,000 bonus & indir. comp., $3,560 expenses, 3,000 shares; **A. P. Adams**, v.p., $32,000 salary, $15,000 bonus & indir. comp., $6,860 expenses, 2,500 shares; **Erwin Balluder**, v.p., $30,000 salary, $10,000 bonus & indir. comp., $6,213 expenses, 14,625 shares; **J. C. Pirio**, v.p. & associate gen. counsel, $30,500 salary, $10,000 bonus & indir. comp., $2,235 expenses, 2880 shares; **R. B. Adams**, v.p., $30,000 salary, $12,000 bonus & indir. comp., $8,403 expenses, 3,040 shares; **A. Jackson Kelly**, v.p., $22,488 salary, $5,000 bonus & indir. comp., $2,633 expenses, 1,408 shares; **H. W. Toomey**, v.p., $20,000 salary, $7,634 expenses; **N. P. Blake**, v.p., $21,000 salary, $5,000 bonus & indir. comp., $4,198 expenses, 1,523 shares; **H. H. Berke**, v.p.-SOS, $28,000 salary, $14,000 bonus & indir. comp., $1,636 expenses, 2,000 shares; **E. M. Goulard**, v.p.-indust. rel., $24,000 salary, $8,000 bonus & indir. comp., $5,666 expenses, 750 shares; **R. S. Mitchell**, v.p.-gmrd, $29,000 salary, $12,000 bonus & indir. comp., $6,969 expenses, 2,547 shares; **R. G. Ferguson**, treas., $30,000 salary, $15,000 bonus & indir. comp., $5,321 expenses, 2,940 shares; **J. S. Woodbridge**, comptroller, $30,000 salary, $15,000 bonus & indir. comp., $2,359 expenses, 400 shares; **J. Macy Jr.**, secy. (**8/1/60), $14,500 salary, $2,000 bonus & indir. comp., $274 expenses; **H. P. Morris**, secy. & gen. attorney (***7/31/60), $8,750 salary, $4,500 bonus & indir. comp., $309 expenses, 3,157 shares; **S. B. Kauffman**, asst. v.p.-engineer., $23,000 salary, $9,000 bonus & indir. comp., $1,853 expenses, 1,000 shares; **W. W. Lynch**, asst. v.p.-communications, $34,326 salary, $6,000 bonus & indir. comp., $5,444 expenses, 2,387 shares; **J. C. Cone**, asst. v.p., $18,000 salary, $7,000 bonus & indir. comp., $18,185 expenses, 6,039 shares; **W. J. McEvoy**, asst. v.p., $15,000 salary, $3,250 bonus & indir. comp., $7,780 expenses, 3,783 shares; **R. E. Smith**, asst. v.p., $23,000 salary, $4,000 bonus & indir. comp., $12,415 expenses, 546 shares; **H. M. Blackwell**, asst. v.p.-sos, $17,500 salary, $3,000 bonus & indir. comp., $1,004 expenses, 150 shares; **R. S. Hogueland**, asst. v.p.-ind. rel., $21,000 salary, $4,000 bonus & indir. comp., $5,582 expenses; 750 shares; **O. J. Studeman**, asst. v.p.-gmrd (**4/5/60), $20,822 salary, $3,500 bonus & indir. comp., $507 expenses, 1,125 shares; **C. W. Moore**, asst. v.p.-traffic & sales admin. (**6/7/60), $8,075 salary, $1,500 bonus & indir. comp., $1,441 expenses, 30 shares; **R. P. Monson**, asst. treas., $20,000 salary, $9,000 bonus & indir. comp., $3,944 expenses, 1,434 shares; **E. Drescher**, asst. comptroller (**9/16/60), $7,292 salary, $6,000 bonus & indir. comp., $3,009 expenses, 1,595 shares; **J. E. McGuire**, asst. comptroller, $17,000 salary, $4,000 bonus & indir. comp., $3,387 expenses, 192 shares; **L. E. Wickeri**, asst. comptroller (***6/28/60), $12,222 salary, $333 expenses; **E. G. Rothrock**, asst. secy., $13,500 salary, $2,000 bonus & indir. comp., $2,822 expenses, 17 shares; **J. L. Cantwell**, asst. secy., $10,300 salary, $750 bonus & indir. comp., $452 expenses, 94 shares.

* appointed director. ** date entered office. ***date retired.

RESORT AIRLINES

OFFICERS: **Morris M. Townsend**, pres. & dir., $15,000 salary, $3,000 expenses, **Thomas B. Wilson**, chm. of board, $15,000 salary, $3,000 expenses; **Douglas P. Larsen**, v.p. & dir., (**8/31/60), $10,000 salary, $2,000 expenses; **Van B. Nixon**, v.p. (***/30/60), $9,000 salary, $2,250 expenses; **James F. Murray**, v.p. & dir., (**12/31/60), $12,832 salary, $2,916 expenses; **John P. Simpson**, v.p. & secy., $8,775 salary; **Thomas Nelson**, v.p., $11,050 salary; **E. M. Bishop**, asst. secy., $7,150 salary; **Steve Bonjour**, asst. secy. & dir., $1,000 salary.

SOUTH PACIFIC AIR LINES

OFFICERS: **R. Stanley Dollar, Jr.**, chm. of board, $536 expenses; **B. C. Heacock**, dir., 25 shares; **J. Harold Dollar, Jr.**, pres. & dir., $8,616 expenses; **Walter Sternberg**, dir., $28,875 bonus & indir. comp., $9,530 expenses; **R. H. Anderson**, dir. (**12/14/60); **John G. Mitchell**, dir. (*12/14/60); **J. D. Hopkins**, v.p.; **W. F. Warren**, v.p., $1,839 expenses; **S. L. Wilson**, v.p., $23,900 salary, $2,339 expenses; **J. D. Fessio**, v.p. (*2/10/60), $18,000 salary, $3,664 expenses; **G. A. Harrison, Jr.**, treas., $1,652 expenses; **R. P. Seeley**, secy.; **D. C. Nichols**, asst. secy.-treas., $5,926 salary, $920 expenses; **C. J. Patterson**, asst. treas.; **M. D. Vooi**, asst. secy.

TRANS WORLD AIRLINES

OFFICERS: **Warren Lee Pierson**, Chm. of Board, $64,821 salary, $4,017 bonus & indir. comp., $11,921 expenses, 200 shares; **Charles S. Thomas**, pres. & dir., $42,134 salary, $7,922 expenses, 500 shares; **E. O. Cocke**, sr. v.p., system gen. mgr. & dir., $45,528 salary, $2,781 bonus & indir. comp., $8,414 expenses, 1,100 shares; **A. V. Leslie**, sr. v.p.-finance, treas. & dir., $45,528 salary, $2,488 bonus & indir. comp., $5,014 expenses, 90 shares; **J. R. Barch**, asst. v.p.-industry sales affairs, $18,016 salary, $1,112 bonus & indir. comp., $6,966 expenses; **E. W. Barker**, asst. secy., $14,659 salary, $908 bonus & indir. comp., $324 expenses; **F. G. Betts**, v.p.-purchasing, $23,934 salary, $1,483 bonus & indir. comp., $1,089 expenses; **A. J. Brough**, asst. v.p.-properties & facilities, $22,516 salary, $805 bonus & indir. comp., $6,206 expenses; **E. P. Burke**, asst. v.p. & exec. asst. to system gen. mgr., $20,141 salary, $1,236 bonus & indir. comp., $631 expenses, 30 shares; **F. E. Busch**, v.p.-equip. retirement, $30,915 salary, $1,915 bonus & indir. comp., $3,814 expenses; **D. J. Crombie**, v.p.-industrial relations* (1/20/60), $24,787 salary, $984 bonus & indir. comp., $5,556 expenses; **P. G. Desautels**, v.p.-national accounts, $24,931 salary, $1,545 bonus & indir. comp., $4,732 expenses, 254 shares; **R. Duckworth**, corporate secy., $18,165 salary, $1,112 bonus & indir. comp., $3,889 expenses; **S. C. Dunlap**, v.p.-cargo sales & market development* (2/11/60), $21,341 salary, $930 bonus & indir. comp., $3,765 expenses, 2,850 shares; **R. M. Dunn**, v.p.-technical services, $29,938 salary, $1,699 bonus & indir. comp., $3,523 expenses; **H. D. Fellows**, asst. v.p.-schedule planning & market research, $22,070 salary, $1,359 bonus & indir. comp., $1,706 expenses, 900 shares; **C. S. Fullerton**, v.p.-sales services, $26,557 salary, $1,637 bonus & indir. comp., $6,439 expenses; **G. L. Gilmore**, v.p.-pub. rel., $25,094 salary, $1,545 bonus & indir. comp., $4,651 expenses, 270 shares; **J. I. Greenwald**, asst. v.p.-customer service, $20,043 salary, $1,236 bonus & indir. comp., $3,045 expenses, 152 shares; **F. D. Hall**, v.p.-gen. transportation mgr., $32,432 salary, $1,854 bonus & indir. comp., $9,559 expenses; **J. D. Harrigan**, reg. v.p.-sales, $20,075 salary, $1,236 bonus & indir. comp., $6,155 expenses; **S. L. Higginbottom**, asst. v.p.-engr. flight test & inspection, $20,206 salary, $1,236 bonus & indir. comp., $1,323 expenses; **T. F. Huntington**, v.p.* (4/28/60) $27,424 salary, $1,341 bonus & indir. comp., $1,524 expenses, 100 shares; **A. E. Jordon**, asst. v.p.-maint. ovhl., $22,135 salary, $1,359 bonus & indir. comp., $705 expenses; **J. W. Letzkus**, reg. v.p.-sales, $24,032 salary, $1,483 bonus & indir. comp., $8,779 expenses, 400 shares; **J. T. Logan**, asst. v.p.-scheduling, $18,192 salary, $1,112 bonus & indir. comp., $525 expenses, 32 shares; **L. P. Marechal**, v.p. & gen. sales mgr., $27,783 salary, $1,699 bonus & indir. comp., $9,854 expenses; **J. N. Martin**, reg. v.p.-sales, $24,032 salary, $1,483 bonus & indir. comp., $6,686 expenses; **R. Mazzarrini**, v.p.-int'l sales development, $19,945 salary, $1,236 bonus & indir. comp., $8,153 expenses, 100 shares; **C. E. McCollum**, v.p. (retired 1/31/60), $1,852 salary, 198 shares; **J. P. Mead**, asst. v.p.-industrial relations, $22,102 salary, $1,359 bonus & indir. comp., $2,734 expenses; **R. E. Montgomery**, reg. v.p.-sales, $27,230 salary, $1,483 bonus & indir. comp., $9,313 expenses; **R. B. Mueller**, asst. v.p.-flight operations, $27,490 salary, $1,689 bonus & indir. comp., $2,292 expenses; **W. E. Rooker**, asst. treas., $20,108 salary, $1,236 bonus & indir. comp., $509 expenses; **R. K. Rourke**, asst. v.p.-equipment planning & development, $21,072 salary, $1,297 bonus & indir. comp., $5,300 expenses; **R. W. Rummel**, v.p.-planning & research, $27,424 salary, $1,699 bonus & indir. comp., $7,073 expenses; **R. A. Schlieder**, asst. v.p.-financial plan. & analysis* (6/1/60), $13,056 salary, $823 bonus & indir. comp., $1,215 expenses; **T. K. Taylor**, v.p.-Washington affairs, $27,587 salary, $1,699 bonus & indir. comp., $7,480 expenses; **J. W. Thomas**, v.p.-civic affairs, $20,075 salary, $1,236 bonus & indir. comp., $5,430 expenses; **W. L. Trimble**, reg. v.p.-transportation, $33,972 salary, $1,637 bonus & indir. comp., $3,907 expenses.

Notes: Charles S. Thomas resigned as president and director 7/27/60.

UNITED AIR LINES

OFFICERS: **W. A. Patterson**, pres., $100,000 salary, 11,648 shares; **J. A. Herlihy**, sr. v.p.-engr. maint., $58,000 salary, 9,105 shares; **D. F. Magarrell**, sr. v.p.-transportation services, $58,000 salary, 4,304 shares; **R. E. Johnson**, sr. v.p.-sales & pub. rel., $54,000 salary, 4,440 shares; **D. R. Petty**, sr. v.p.-flight operations, $58,000 salary, 2,241 shares; **Curtis Barkes**, sr. v.p.-fin. & prop., $54,000 salary, 4,495 shares; **R. F. Ahrens**, sr. v.p.-personnel, $43,000 salary, 3,589 shares; **H. E. Nourse**, sr. v.p.-econ. controls, $35,000 salary, 4,369 shares; **C. F. McErlean**, v.p.-law, $37,000 salary, 555 shares; **S. P. Martin**, secy. of corp. & asst. to pres., $24,000 salary, 930 shares; **R. E. Bruno**, compt. & asst. secy., $28,300 salary, 679 shares; **A. M. deVoursney**, v.p. & treas., $30,000 salary, 424 shares; **G. E. Keck**, v.p.-maint., $30,000 salary, 374 shares; **O. T. Larson**, v.p.-ground services, $33,000 salary, 650 shares; **O. C. Enge**, v.p.-passenger service, $29,000 salary, 875 shares; **I. E. Sommermeyer**, v.p.-flying, $38,000 salary, 312 shares; **J. M. Hodgson**, v.p.-communications, $35,500 salary, 1,120 shares; **B. B. Gragg**, v.p.-marketing, $31,400 salary, 900 shares; **R. M. Ruddick**, v.p. & asst. to pres., $21,333 salary, 56 shares; **J. E. Moore**, v.p.-traffic, $25,000 salary, 579 shares; W. C. Mentzer, v.p.-engineering, $42,000 salary, 1,149 shares; **H. J. Merchant**, v.p.-sales mgr., $28,500 salary, 27 shares; **D. V. O'Leary**, v.p.-purchasing & stores, $28,300 salary, 798 shares; **D. C. Meenan**, v.p.-facilities & property, $24,000 salary, 636 shares; **C. M. Mason**, v.p.-employee relations, $28,000 salary, 664 shares; **L. F. Hampel** v.p.-business research, $22,400 salary, 154 shares; **W. E. Alberts**, v.p. & asst. to pres., $25,200 salary, 152 shares.

WESTERN AIR LINES

OFFICERS: **Terrell C. Drinkwater**, pres. & dir., $76,633 salary & dir. fee, $16,003 expenses, 7,000 shares; **Stanley R. Shatto**, v.p.-oper. & dir., $48,933 salary & dir. fee, $2,670 expenses, 3,991 shares; **Marvin W. Landis**, v.p.-service, $38,000 salary, $1,197 expenses, 1,680 shares; **Arthur F. Kelly**, v.p.-sales, $38,000 salary, $6,252 expenses, 3,436 shares; **J. Judson Taylor**, v.p. & treas., $38,000 salary, $1,500 expenses, 2,900 shares; **D. P. Renda**, v.p.-legal & secy., $38,000 salary, $6,209 expenses, 1,069 shares; **Stanley Gewirtz**, v.p.-admin., (retired 3/17/61), $34,500 salary, $16,337 expenses; **G. G. Brooder**, v.p., $29,667 salary, $10,244 expenses, 1,000 shares; **Charles J. J. Cox**, controller & asst. treas., $29,667 salary, $1,553 expenses, 1,684 shares; **William C. Jennings**, asst. secy., $16,800 salary, $137 expenses, 105 shares; **John W. Simpson**, asst. secy., $16,800 salary, $5,403 expenses, 100 shares.

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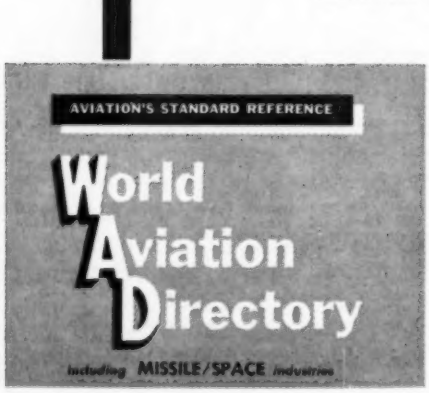

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CARGO

AAXICO AIRLINES

OFFICERS: **Howard J. Korth**, pres., $96,000 salary, $3,273 expenses, 44,332 1/6 shares; **Jean G. Helvey**, v.p., $22,200 salary, $11,525 bonus & indir. comp., $1,674 expenses; **E. P. Odenwalder**, secy. treas., $13,200 salary, $5,000 bonus & indir. comp., $817 expenses; **J. A. Young**, v.p., $12,025 salary, $411 expenses; **Stephanie J. Urban**, asst. secy., $6,000 salary, $3,000 bonus & indir. comp.; **Coates Lear**, asst. secy.

FLYING TIGER LINE

OFFICERS: **Robert W. Prescott**, pres & dir., $60,000 salary, $14,414 expenses, 2,562 shares; **Fred Benninger**, v.p. & treas., $35,000 salary, $6,923 expenses; **William E. Bartling**, v.p., $19,800 salary, $2,140 expenses, 5 shares; **George T. Cussen**, v.p., $14,000 salary, $3,320 expenses, 10 shares common, 33 shares pref.; **John L. Higgins**, v.p., $25,000 salary, $3,894 expenses; **Leonard S. Kimball**, v.p., $14,400 salary, $7,063 expenses; **Frank B. Lynott**, v.p., $32,000 salary, $3,396 expenses; **George S. Oberdorf**, v.p., $18,000 salary, $6,144 expenses; **O. R. Burghardt**, secy.-asst. treas., $21,600 salary, $205 expenses; **Ralph B. Stump**, asst. secy., $14,400 salary, $60 expenses; **Norman L. Meyers**, asst.-secy. & dir., $200 bonus & indir. comp., $152 expenses, 54 shares common, 8 shares pref., 200 debentures.

SEABOARD WORLD AIRLINES

OFFICERS: **R. A. Norden**, pres. (**11/1/60), $31,166 salary, $1,691 expenses, 42 shares; **A. V. Norden**, exec. v.p. & dir., (**11/1/60), $34,166 salary, $14,019 expenses, 3,342 shares; **Harold Montee**, v.p.-Washington (**11/1/60), $17,500 salary, $4,836 expenses, 625 shares; **R. M. Jackson**, pres. & chm. of board (*11/1/60), $14,400 salary, $1,893 expenses; **J. H. Mahoney**, sr. v.p.-sales (*11/1/60), $3,375 salary, $668 expenses; **C. D. Brell**, sr. v.p.-operations (*11/1/60), $24,583 salary, $1,734 expenses; **S. I. Fondiler**, sr. v.p.-financial (*11/1/60), $29,833 salary, $795 expenses; **W. P. Neth**, v.p. & secy. (*11/1/60), $22,125 salary, $10,075 expenses, 104 shares; **J. H. Rosenwald**, v.p.-admin. (*11/1/60), $13,950 salary, $165 expenses; **A. Thomson**, v.p.-cargo sales (*11/1/60), $14,750 salary, $1,480 expenses, 104 shares.

SLICK AIRWAYS

OFFICERS: **Earl F. Slick**, chm. of board, $8,194 expenses, 167,983 shares; **A. W. Johnson**, exec. v.p. & dir., $25,000 salary, $5,000 bonus & indir. comp., $7,727 expenses; **William E. Miller**, asst. secy., $253 expenses, 2,500 shares; **H. P. Huff, Jr.**, v.p., $21,538 salary, $3,000 bonus & indir. comp., $4,503 expenses; **J. H. Malone**, asst. treas., $12,724 salary, $1,200 bonus & indir. comp., $2,833 expenses; **O. N. Crider**, asst. secy. (*7/26/60), $8,000 salary, $500 bonus & indir. comp.; **John E. Gallagher**, v.p. (*7/26/60) & dir., $20,000 salary, $9,126 bonus & indir. comp.

LOCALS

BONANZA AIR LINES

OFFICERS: **E. C. Converse**, pres. & chm. of board, $20,000 salary, $941 expenses, 212,261 shares; **G. R. Henry**, exec. v.p. & dir., $19,000 salary, $2,021 expenses, 250 shares; **M. W. Reynolds**, v.p.-operations, $18,500 salary, $1,027 expenses; **R. J. Sherer**, v.p.-finance & treas., $14,000 salary, $2,791 expenses, 900 shares; **W. J. Mitchell**, v.p.-sales, $15,381 salary, $3,849 expenses, 100 shares; **R. O. Hawkins**, general counsel & secy., $13,377 salary, $1,742 expenses; **E. E. Jochim**, asst. secy., $12,167 salary, $1,529 expenses, 100 shares; **T. J. Van Bogart**, comptroller & asst. secy., $10,625 salary, $200 expenses; **W. C. Burt**, asst. secy., 1400 shares.

CENTRAL AIRLINES

OFFICERS: **Keith Kahle**, pres., $18,000 salary, $2,660 expenses, 26,004 shares; **F. E. Howe**, exec. v.p.-treas., $17,000 salary, $851 expenses, 1,525 shares; **R. L. Wageneck**, v.p.-operations, $16,000 salary, $489 expenses, 500 shares; **A. S. Aldridge**, v.p.-sales, $13,000 salary, $2,489 expenses, 2,896 shares common, 8 shares pref.; **C. E. Lundstrom**, secy. & asst. treas., $10,000 salary, $179 expenses, 563 shares; **W. A. Whitlock**, chief pilot, $14,400 salary, $51 expenses; **F. Kirk Johnson**, chm. of board, $8,000 salary, 143,239 shares.

FRONTIER AIRLINES

OFFICERS: **L. B. Maytag, Jr.**, pres. & chm. of board, $18,000 salary, $1,119 expenses, 489,101 shares; **G. R. Woody**, exec. v.p., $27,480 salary, $381 expenses; **J. D. Brock**, v.p.-traffic & sales, $15,900 salary, $916 expenses; **R. P. Minniear**, v.p.-operations (*5/1/60), $8,000 salary, $271 expenses; **E. F. Dolansky**, treas. (*5/1/60), $8,583 salary, $534 expenses; **R. W. Dunn**, asst. treas. (*8/1/60), $4,166 salary; **J. A. Love**, secy. (*7/1/60), $140 expenses, 122 shares; **L. Gross**, asst. secy. (*4/12/60;) **L. P. Blatter**, v.p.-finance & treas. (**4/30/60), $9,347 salary, $284 expenses, 80 shares; **H. P. Barnard Jr.**, v.p.-operations (**4/30/60), $9,061 salary, $372 expenses, 225 shares.

* date entered office. ** date retired.

LAKE CENTRAL AIRLINES

OFFICERS: **Dr. R. B. Stewart**, chm. exec. committee, board of directors, $3,000 bonus & indir. comp., 1,500 shares; **Joseph J. O'Connell**, chm. of board, $2,400 salary, $1,150 bonus & indir. comp., $677 expenses, 2,166 shares; **Gwin Hicks**, pres. & dir., $18,999 salary, $5,303 expenses, 6,532 shares; **L. W. Hartman**, exec. v.p. & dir., $20,856 salary, $3,184 expenses, 5,400 shares; **Wm. H. Krieg**, secy. & dir., $600 bonus & indir. comp., 1,878 shares; **R. W. Clifford**, v.p. & dir., $15,000 salary, $1,737 expenses, 2,339 shares; **D. S. Getchell**, v.p., $12,999 salary, $1,017 expenses, 133 shares; **J. L. Coy**, treas. & asst. secy., $9,999 salary, $295 expenses, 4,100 shares; **A. F. Grisard**, asst. secy., 4,111 shares; **J. R. Carr Jr.**, asst. secy., 509 shares; **R. P. West**, asst. secy., 1,233 shares; **J. Dwight Peterson**, dir., $600 bonus & indir. comp.; **Cecil A. Berry**, dir., $400 bonus & indir. comp.

MOHAWK AIRLINES

OFFICERS: **R. E. Peach**, pres. & dir., $38,000 salary, $3,953 expenses, 10,000 shares; **J. R. Carver**, v.p. & dir., $25,000 salary, $3,109 expenses, 4,018 shares; **C. A. Benscoter**, v.p. & dir., $25,000 salary, $780 expenses, 3,782 shares; **E. V. Underwood**, chm. of board, $4,500 salary, $258 expenses, 3,000 shares; **F. R. Chabot**, treas., $16,500 salary, $987 expenses, 100 shares; **B. C. McLean**, secy., $11,666 salary, $1,960 expenses; **B. J. Miner**, dir., 133 shares; **W. J. Fields**, dir., 1,000 shares; **E. A. Link**, dir., 24,111 shares; **P. A. Schoellkopf Jr.**, dir.; **J. C. Corwith**, dir.; **W. V. Daugherty**, dir., 2,500 shares; **C. W. Sorrell**, dir., 151 shares; **L. P. Hornbrook**, asst. secy., $5,460 salary, $378 expenses, 16 shares; **H. R. Thomas**, asst. secy., $7,000 salary, $667 expenses, 15 shares; **R. V. Stephenson**, v.p., $13,000 salary, $1,691 expenses, 150 shares; **R. R. Taylor**, v.p. (*5/1/60), $13,666 salary, $1,293 expenses, 254 shares.

* date entered office. All Mohawk stock is capital.

NORTH CENTRAL AIRLINES

OFFICERS: **H. N. Carr**, pres. & dir., $40,000 salary, $600 dir. fee, $4,054 expenses, 53,882 shares; **F. N. Buttomer**, v.p.-traffic & sales, $16,800 salary, $2,933 expenses, 5,333 shares; **A. E. Schwandt**, v.p.-industrial relations, $13,140 salary, $828 expenses, 3,715 shares; **R. H. Bendio**, v.p.-maintenance & engineering, $15,300 salary, $900 expenses, 7,500 shares; **A. D. Niemeyer**, v.p.-operations, $14,580 salary, $1,001 expenses; **B. Sweet**, v.p., secy. & treas., $15,720 salary, $691 expenses, 5,308 shares; **J. P. Dow**, asst. secy., $7,560 salary, $704 expenses, 5 shares; **A. E. A. Mueller**, chm. of board, $27,500 salary, $600 dir. fee, $9,046 expenses, 600,962 shares; **W. L. Christensen**, acct. consult. & dir., $3,600 salary, $600 dir. fee, $132 expenses, 5,496 1/2 shares; **G. F. De Coursin**, sales consultant & dir., $2,400 salary, $500 dir. fee, $617 expenses, 8,887 1/2 shares.

OZARK AIR LINES

OFFICERS: **F. W. Jones**, chm. of board, $10,000 salary, $900 dir. fee, $371 expenses, 561,889 shares; **J. H. FitzGerald**, pres. & dir., $25,000 salary, $900 dir. fee, $1,547 expenses, 1,000 shares; **J. P. Bradshaw**, sr. v.p. & dir., $19,683 legal services, $900 dir. fee, $807 expenses, 64,267 shares; **A. G. Heyne**, secy. & dir., $10,000 salary, $900 dir. fee, $1,013 expenses, 40,000 shares; **E. H. Green**, treas. & dir., $10,000 salary, $900 dir. fee, $1,447 expenses, 45,933 shares; **G. O. Shaver**, flight operations captain & dir., $24,740 salary, $900 dir. fee, $516 expenses, 118,810 shares.

PACIFIC AIR LINES

OFFICERS: **J. H. Connelly**, pres. & dir., $25,000 salary, $4,276 expenses, 142,052 shares; **T. R. Mitchell**, exec. v.p. & dir., $20,000 salary, $4,904 expenses, 2,229 shares; **M. A. King**, v.p.-sales, $11,600 salary, $3,810 expenses, 220 shares; **C. A. Myhre**, v.p.-finance & dir., $19,666 salary, $1,862 expenses, 800 shares; **H. S. White**, v.p.-operations & dir., $18,500 salary, $76 expenses; **H. L. Boros**, v.p.-legal (**9/30/60), $9,000 salary, $450 expenses; **E. R. Dahl**, treas., $11,000 salary, $691 expenses, 508 shares; **R. E. Costello**, v.p.-traffic, $12,854 salary, $1,924 expenses, 450 shares; **Leland Hayward**, chm. of board, 143,988 shares; **Floyd L. Hendrickson**, asst. secy., 5,000 shares.

PIEDMONT

OFFICERS: **T. H. Davis**, pres., treas. & dir., $30,000 salary, $3,768 expenses, 133,821 shares; **C. G. Brown, Jr.**, v.p. & dir., $15,000 salary, $1,861 expenses, 4,200 shares; **H. K. Saunders**, v.p. & dir., $18,000 salary, $1,267 expenses, 4,225 shares; **R. S. Northington**, v.p. & dir., $16,649 salary, $3,815 expenses, 6,100 shares; **M. F. Fare**, secy., asst. treas. & dir., $12,504 salary, $1,820 expenses, 6,401 shares; **T. W. Morton**, asst. controller, $9,250 salary, $472 expenses, 200 shares; **J. R. Farley**, asst. secy. (*7/28/60); **G. E. Anderson**, dir., $200 bonus & indir. comp., 800 shares; **E. L. Davis**, dir., $200 bonus & indir. comp., 8,036 shares; **E. L. Davis, Jr.**, dir., $150 bonus & indir. comp., 5,622 shares; **Frank Dowd**, dir., $100 bonus & indir. comp., $37 expenses, 1,000 shares.

SOUTHERN AIRWAYS

OFFICERS: **Frank W. Hulse**, pres. & dir., $25,000 salary, $5,268 expenses, 34,019 shares; **Graydon Hall**, v.p.-sales, $18,000 salary, $3,816 expenses; **W. S. Magill**, v.p.-operations, $19,292 salary, $827 expenses, 800 shares; **George F. Estey**, secy. & treas., $12,185 salary, $500 expenses, 1,521 shares; **C. H. D. Tarrer**, asst. treas., $11,737 salary, $2,690 expenses, 325 shares; **C. A. Beasley**, asst. secy. & dir., $3,300 salary, $141 expenses, 3,500 shares; **W. B. White, Jr.**, asst. secy. & dir., $194 expenses, 932 shares; **G. F. Attwood**, asst. v.p., $9,052 salary, $2,255 expenses, 25 shares; **J. K. Courtenay**, asst. v.p., $8,793 salary, $788 expenses; **G. M. Gross**, asst. v.p., $11,250 salary, $29 expenses, 100 shares; **W. B. Grubb**, asst. v.p., $17,619 salary, $285 expenses; **Ike F. Jones**, v.p., 2,167 shares.

TRANS-TEXAS AIRWAYS

OFFICERS: **R. E. McKaughan**, pres., $32,700 salary, $7,205 expenses, 32,060 shares; **H. E. Erdmann**, v.p.-operations, $18,000 salary, $932 expenses, 5,794 shares; **L. J. Eichner**, v.p.-traffic, $17,100 salary, $1,397 expenses, 670 shares; **W. C. Leatherwood**, v.p.-purchasing, $11,400 salary, $330 expenses, 860 shares; **J. M. Brooks**, asst. v.p.-operations, $10,500 salary, $602 expenses, 1,040 shares; **J. K. Ayers**, v.p.-public affairs, $11,400 salary, $2,315 expenses, 385 shares; **P. S. Reid**, v.p.-personnel, $10,800 salary, $33 expenses, 180 shares; **R. E. McKaughan, Jr.**, asst. secy. (*5/26/60), $10,200 salary, $1,394 expenses, 5,400 shares.

WEST COAST AIRLINES

OFFICERS: **Nick Bez**, pres. & dir., $19,200 salary, $1,267 expenses, 54,600 1/2 shares; **E. B. Code**, v.p., $13,800 salary, $769 expenses, 494 shares; **T. R. Croson**, v.p., $12,000 salary, $1,995 expenses, 262 shares; **G. E. Hatch**, v.p. (*4/1/60), $9,750 salary, $1,529 expenses, 150 shares; **H. F. Scheurer, Jr.**, v.p., $18,500 salary, $2,699 expenses, 100 shares; **S. M. Selby**, v.p., $13,200 salary, $642 expenses, 50 shares; **S. R. Severtson**, v.p., $16,000 salary, $677 expenses, 150 shares; **W. R. Thrall**, v.p. (*10/27/60 & dir. (*3/16/60), $15,000 salary, $186 expenses; **L. J. Hawkinson**, secy.-treas., $15,600 salary, $1,132 expenses, 5 shares; **K. N. Laurin**, asst. treas., $9,201 salary, $249 expenses; **Wm. Calvert**, v.p. & dir., 9,523 shares; **Jas. W. Johnston**, asst. secy.

OTHERS

ALASKA AIRLINES

OFFICERS: **Charles F. Willis, Jr.**, pres. & dir., $39,999 salary, $200 bonus & indir. comp., $11,125 expenses, 42,300 shares; **Joseph F. Clark**, dir., $8,637 salary, $200 bonus & indir. comp., $7,453 expenses, 1,000 shares; **Richard W. Gilbert**, exec. v.p., secy. & dir., $22,000 salary, $200 bonus & indir. comp., $4,473 expenses, 500 shares; **Donald M. Kendall**, dir., $200 bonus & indir. comp., 10 shares; **Jay G. Larson**, dir., $150 bonus & indir. comp., 20 shares; **Edward J. Rusing**, dir., $200 bonus & indir. comp., 1,000 shares; **Joseph P. Walker, Jr.**, dir., $200 bonus & indir. comp. 31,405 shares (joint tenancy); **Richard Maass**, dir. (*2/18/60), $150 bonus & indir. comp., 100 shares; **Henry M. Margolis**, dir., $150 bonus & indir. comp., 2,700 shares; **George Kinnear**, dir., (**9/30/60), $100 bonus & indir. comp., 1,000 shares; **Robert B. Atwood**, dir. (*9/30/60), 1,100 shares; **M. E. Sharp**, v.p.-adm. & asst. secy. (*9/30/60), $12,500 salary, $1,524 expenses, 5 shares; **L. E. Peterson**, v.p.-services, $12,250 salary, $3,732 expenses, 500 shares; **R. H. Herrnstein**, treas. & comptroller, $10,916 salary, $476 expenses, 500 shares; **D. L. Ingalls**, asst. treas. & secy., $11,083 salary, $4,979 expenses, 5 shares.

ALASKA COASTAL AIRLINES

OFFICERS: **Sheldon B. Simmons**, co-manager, $19,-

ON-TIME BOXSCORE

Effective with this issue, **AIRLIFT** is expanding its report of airline "on time" performance to include the number of nonstop and one-stop flights flown during the period.

The addition of these statistics will add a measure of the volume of services among carriers and provide a sounder basis upon which to compare the "on time" results of one airline with another.

FEBRUARY, 1961

Airline Ranking		On time to 15 min. late	No. of Flights*
TRUNKS			
1	Western	81.6 %	669
2	United	78.9	3951
3	American	76.9	3946
4	Braniff	75.5	1191
5	TWA	75.3	1830
6	Eastern	73.8	2937
7	Continental	73.6	1262
8	Capital	64.6	1808
9	National	59.2	461
10	Northeast	59.0	1904
11	Delta	52.2	1647
12	Northwest	...	...
707 & DC-8			
1	Western	68.47%	111
2	Continental	68.41	396
3	TWA	67.6	609
4	American	66.7	925
5	United	64.7	1114
6	Eastern	53.8	498
7	Braniff	51.2	164
8	National	48.5	208
9	Delta	39.9	388
10	Northeast	24.0	50
	Northwest	...	...
720			
1	United	72.8 %	350
2	Capital	66.6	207
3	American	48.5	241
880			
1	TWA	41.9 %	62
2	Delta	33.5	438
3	Northeast	5.1	270
ELECTRA			
1	Braniff	87.2 %	94
2	American	78.3	860
3	Eastern	71.6	377
4	Western	69.6	66
5	National	60.8	46
6	Northwest	...	...
LOCAL SERVICE			
1	Frontier	86.0 %	215
2	West Coast	82.8	192
3	North Central	78.5	1029
4	Central	74.5	59
5	Bonanza	71.3	360
6	Pacific	70.1	154
7	Piedmont	69.0	42
8	Allegheny	68.3	382
9	Ozark	67.05	626
10	Southern	67.01	255
11	Lake Central	66.5	233
12	Mohawk	52.7	639
13	Trans-Texas	44.3	196

SOURCE: AIRLIFT Research

* Nonstop and one-stop flights only
Note: Northwest's operation affected by labor shutdown

824 salary, $1,731 expenses; **O. F. Benecke**, co-manager, $19,039 salary, $1,110 expenses.

ALOHA AIRLINES

OFFICERS: **Ruddy F. Tongg**, chm. of board, $13,800 salary, 201,532 shares pref.; **Hung Wo Ching**, pres. & dir., $15,000 salary, $1,626 expenses, 23,600 shares common, 579,760 shares pref.; **Kenneth Char**, exec. v.p. & dir., $14,833 salary, $1,423 expenses, 13,250 shares pref.; **John M. Brown**, v.p.-operations, $14,955 salary, $588 expenses; **Richard H. King**, sr. v.p.-traffic & sales, $18,564 salary, $3,394 expenses.

AVALON AIR TRANSPORT

OFFICERS: **Wilton R. Probert**, pres., $12,500 salary, $2,216 expenses, 175 shares; **W. B. von Kleinsmid**, v.p., secy.-treas., $12,500 salary, $2,002 expenses, 175 shares.

CARIBBEAN ATLANTIC AIRLINES

OFFICERS: **Dionisio Trigo**, pres., $25,000 salary, $5,900 expenses, 18,221 shares; **Benigno Trigo**, v.p., $10,000 salary, 18,221 shares; **Jose M. Sierra**, v.p.-operations, $15,000 salary, $2,000 bonus and indir. comp., $2,543 expenses, 208 shares; **Robert B. Forrest**, v.p.-traffic, $10,600 salary, $1000 bonus & indir. comp., $6,359 expenses, 4 shares; **L. A. Lockhart**, treas., $9,600 salary, $1,000 bonus & indir. comp., $529 expenses, 260 shares; **Jose G. Gonzalez**, secy. (3/28/60).

CHICAGO HELICOPTER AIRWAYS

OFFICERS: **John S. Gleason, Jr.**, pres. treas. & dir., $28,000 salary, $250 bonus & indir. comp., $2,272 expenses, 30,842 shares; **C. W. Moore**, exec. v.p. & dir., $25,000 salary, $250 bonus & indir. comp., $1,933 expenses, 10,000 shares; **Robert B. Kiel**, asst. secy.-treas., $13,000 salary, $521 expenses; **Robert S. Angstadt**, v.p.-operations, $17,500 salary, $2,037 expenses, 300 shares; **John C. Brogan**, v.p., secy. & dir., $9,600 salary, $250 bonus & indir. comp., $68 expenses, 6,781 shares; **C. F. Liske**, v.p.-traffic & sales, $12,500 salary, $1,545 expenses; **Weymouth Kirkland**, dir., $100 bonus & indir. comp.

CORDOVA AIRLINES

OFFICERS: **Merle K. Smith**, pres. & dir., $20,000 salary, $6,796 expenses, 18,050 shares; **Richard R. Borer**, v.p. & dir., $200 dir. fee. $19 expenses, 200 shares; **Glen Dillard**, secy., treas. & dir. (**2/28/60), $2,666 salary, 2,500 shares.

ELLIS AIR LINES

OFFICERS: **G. A. Bodding**, v.p.-operations & dir., $16,215 salary, $262 expenses, 8,612 shares; **R. E. Ellis**, pres. & dir., $16,800 salary, $2,407 expenses, 21,296 shares; **N. T. Garde**, secy. & dir., $16,110 salary, $358 expenses, 4,833 shares; **J. L. Sherman**, v.p.-maint. & dir., $13,800 salary, $629 expenses, 8,075 shares.

KODIAK AIRWAYS

OFFICER: **Robert L. Hall**, pres., $18,000 salary, $1,497 expenses, 29,998 shares.

LOS ANGELES AIRWAYS

OFFICERS: **C. M. Belinn**, pres., $25,000 salary, $3,308 expenses, 6,163 shares; **J. T. Kane**, v.p. & treas., $15,167 salary, $1,064 expenses; **F. W. Milam**, v.p.-transportation, $14,000 salary, $206 expenses, 456 shares; **E. H. Slingsby**, asst. treas. (*5/27/60), $9,175 salary; **M. F. Bagan**, v.p. & asst. to pres. (**8/10/60), $10,333 salary, $706 expenses.

NEW YORK AIRWAYS

OFFICERS: **Robert L. Cummings, Jr.**, pres. & dir., $23,300 salary, $9,883 expenses, 2,250 shares; **Horace Brock**, v.p. & dir., $3,629 salary, $3,906 bonus & indir. comp., $153 expenses, 1,250 shares; **John E. Gallagher**, v.p., $16,849 salary, $4,595 expenses, 500 shares; **William W. Hogan**, v.p. & treas., $13,566 salary, $1,698 expenses, 500 shares; **Glen B. Eastburn**, v.p., asst. to pres. & asst. treas., $11,000 salary, $32 expenses, 100 shares; **Richard Wheatland II**, (*12/5/60), $10,000 salary, $1,753 expenses, 500 shares; **John H. Slate**, secy.; **Leslie G. Carter**, asst. v.p., $18,043 salary, $321 expenses, 100 shares; **Ray de Haan**, asst. v.p.-maint., $12,000 salary, $259 expenses, 500 shares; **Gerald J. Glynn**, asst. treas., $8,289 salary, $180 expenses; **Florence Peters**, asst. secy., $5,243 salary, $56 expenses.

PACIFIC NORTHERN AIRLINES

OFFICERS: **A. G. Woodley**, pres. & dir., $35,000 salary, $100 bonus & indir. comp., $4,075 expenses, 226,378 shares; **J. A. Cunningham**, v.p. & dir., $19,436 salary, $100 bonus & indir. comp., $178 expenses, 1,500 shares; **H. A. Olsen**, v.p., $17,109 salary, $982 expenses, 5,065 shares; **J. H. Foster**, v.p., $17,103 salary, $474 expenses, 1,000 shares; **Felix Aubuchon**, v.p., $14,135 salary, $13 expenses, 4,100 shares; **T. D. Stuart**, v.p., $13,200 salary, $366 expenses, 1,700 shares; **C. W. Nelson**, secy.-treas. & dir., $15,548 salary, $100 bonus & indir. comp., $196 expenses, 500 shares; **M. E. Diamond**, asst. secy., $9,894 salary, $115 expenses, 27,713 shares; **D. B. Hart**, asst. secy., $11,428 salary, $138 expenses, 2,520 shares.

REEVE ALEUTIAN AIRWAYS

OFFICERS: **Robert C. Reeve**, pres., $18,000 salary, $3,859 expenses, 225 shares; **Robert L. Hanson**, v.p., $12,000 salary, $5,000 bonus & indir. comp., $221 expenses, 50 shares; **Margaret Rutledge**, secy.-comptroller, $12,000 salary, $1,000 bonus & indir. comp., $75 expenses; **Janice M. Reeve**, treas., $12,000 salary, 225 shares.

WEIN ALASKA AIRLINES

OFFICERS: **Sigurd Wien**, pres. & chm. of board, $23,000 salary, $169 expenses, 5,532 shares; **George B. Rayburn**, exec. v.p., $21,802 salary, $1,673 expenses, 1,140 shares; **Fritz Wien**, v.p.-operations, $19,550 salary, $770 expenses, 1,119 shares; **A. E. Hagberg**, v.p.-traffic, $19,478 salary, $2,849 expenses, 126 shares; **Noel Wien**, v.p.-public relations, $18,975 salary, $2,554 expenses, 1,126 shares; **R. M. King**, secy., $20,100 salary (no salary as secy.), 101 shares; **Richard B. Webb**, asst. secy. (**4/5/60), 52 shares; **Marian Barnes**, asst. secy., $6,471 salary; **Maxine Whitney**, asst. secy. (**4/5/60), 25 shares; **Bonnie Staheli**, asst. secy. (**4/5/60); **Alvin Polet**, asst. secy. & dir., 184 shares.
* date entered office. ** date term expired.

WESTERN ALASKA AIRLINES

OFFICERS: **Albert W. Ball**, pres., $17,500 salary, 238 shares; **Myron Moran**, v.p., $14,500 salary, 238 shares; **Clarence Wren**, secy.-treas., 100 ¼ shares.

Domestic Traffic Slumps During Bad 1st Quarter

The impact of the walkout of flight engineers is evident throughout the traffic results of the U.S. domestic and international trunk airlines for the first three months of 1960 (see next page).

Of the 12 domestic trunks, six experienced major declines in passenger miles over 1960 and only three (United, Delta and Northeast) showed substantial gains. In international service, both Pan American and TWA were hard hit in February with declines of 11.5% in passenger-miles over 1960.

In a new airline ranking to be computed throughout the year, *AIRLIFT*'s analysis shows that United, American, Eastern and TWA, in that order, led the domestic trunks both in passenger-miles and number of passengers.

In international services, Pan Am, Eastern, TWA and United are the top four. Among local operators, North Central, Allegheny, Mohawk and Pacific lead in passenger miles. Ozark displaces Pacific in No. 4 spot when ranked by passengers.

Intra-Hawaiian operations for both Hawaiian and Aloha show a decline from 1960 with HAL bearing the brunt with a 30% dip. Aloha is down 3%. Of the 27 million passenger-miles operated through March, Hawaiian accounts for 58% and Aloha 42%. ■

U.S. Airline Traffic - - February/March
1961 vs. 1960

This complete summary compiled by AIRLIFT Magazine from official CAB data

	Revenue Passengers (000)				Revenue Passenger Miles (000)				Total 1961 to Date (000)			
	February	% Chge	March	% Chge	February	% Chge	March	% Chge	Revenue Pass. Miles	% Chge	Revenue Pass.	% Chge
DOMESTIC												
UAL	594	21.2	691	30.1	433,746	35.9	489,170	37.0	1,384,482	34.6	1,911	24.6
AA	384	—35.5	622	— 2.4	300,717	31.2	468,476	1.0	1,259,525	—10.7	1,626	—13.8
EAL	438	—32.0	682	1.3	243,823	—31.7	379,252	1.2	975,812	—13.1	1,746	—13.3
TWA	238	—33.1	386	0.5	204,008	—31.1	328,611	1.8	867,383	—12.1	995	—13.0
DAL	291	18.3	335	22.7	176,013	26.0	198,596	29.4	552,347	24.9	929	18.0
CAP	251	— 1.6	291	1.4	114,537	6.7	129,639	6.5	363,505	4.6	814	— 0.2
NAL	97	—31.2	151	2.7	67,637	—33.0	94,554	— 8.1	259,326	—15.8	394	— 9.9
BNF	172	— 0.6	186	— 0.5	80,094	4.2	83,942	— 1.2	250,174	2.9	539	0.7
CAL	104	13.0	111	11.0	73,968	26.3	69,450	10.6	214,145	7.4	322	5.9
NEA	121	17.5	153	47.1	66,479	29.0	78,706	61.1	195,777	29.6	389	25.1
WAL	76	—46.1	37	—73.9	42,614	—45.2	22,944	—70.6	142,164	—41.5	241	—44.5
NWA	7	—93.8	67	—55.0	9,184	91.4	49,223	—55.9	89,895	—73.9	116	—74.2
Total ...	2,773	—17.9	3,712	2.7	1,812,820	—14.9	2,392,563	4.8	6,554,535	— 4.0	10,022	— 6.3
INTERNATIONAL												
PAA	166	—19.0	254	14.4	287,860	—11.5	431,226	20.4	1,091,035	4.0	653	— 0.9
LAD	67	—34.9	95	— 3.1	80,536	—32.4	115,359	...	308,182	—17.3	256	—19.5
ATL	68	— 1.4	115	32.2	95,097	— 6.1	153,322	25.0	373,171	8.2	283	18.9
PAC	28	— 6.7	40	21.2	109,382	7.4	158,667	36.4	398,067	24.0	103	11.9
ALA	3	...	4	...	2,845	— 0.1	3,878	2.2	11,615	9.8	11	...
EAL	33	...	47	38.2	51,340	6.4	71,932	43.8	195,500	29.4	126	23.5
SJU	26	...	37	37.0	40,138	0.8	55,729	35.3	155,689	23.7	102	24.4
BDA	1	—50.0	2	—33.3	798	—44.4	1,896	— 2.0	3,833	—17.0	4	—42.9
MEX	6	20.0	8	100.0	10,404	48.6	14,307	107.7	35,978	74.9	20	53.8
TWA	8	—46.7	19	— 5.0	23,380	—45.1	52,207	—12.7	127,927	—14.2	47	— 6.0
UAL	12	100.0	11	22.2	29,936	97.9	28,035	20.8	85,187	59.8	34	61.9
NWA	7	—50.0	11	—26.7	17,144	31.0	19,921	—27.9	51,855	—32.9	25	—43.2
PGA	9	—18.2	11	...	16,349	— 4.9	18,564	10.7	51,551	4.7	30	— 6.3
TRC	8	33.3	8	14.3	13,729	30.9	13,575	37.5	49,502	36.3	26	13.0
BNF	8	60.0	8	100.0	11,834	43.1	11,318	37.4	34,745	47.0	23	76.9
AA	6	—45.5	8	—27.3	6,333	47.3	8,938	—22.4	23,165	—33.9	22	—33.3
WAL	2	—60.0	2	—50.0	3,270	—57.3	2,760	—58.9	11,924	—48.1	8	—46.7
CBA	35	...	39	14.7	2,614	6.0	2,805	15.6	7,838	9.4	108	6.9
DAL	1	—50.0	1	—50.0	1,589	—45.2	1,578	—45.9	5,221	—46.8	3	—57.1
NAL	NA	...	NA	...	NA	...	NA	...	852	—87.2	...	...
Total ...	295	—15.7	419	11.7	465,378	—10.3	662,867	14.6	1,736,302	3.9	1,105	0.1
LOCAL SERVICE												
NOR	72	33.3	78	1.3	13,532	54.0	14,063	6.1	43,025	24.5	234	15.8
AAA	46	48.4	61	48.8	9,789	86.2	12,577	68.3	33,236	76.2	160	50.9
MOH	49	36.1	56	124.0	10,027	48.2	11,286	136.7	31,590	59.4	156	51.5
PAC	34	17.2	41	5.1	8,114	25.5	9,691	9.9	25,394	7.0	107	1.9
FAL	28	55.5	30	15.4	8,214	91.9	8,324	22.6	23,877	34.8	85	23.2
OZA	39	25.8	45	4.7	7,373	35.3	8,093	7.4	23,390	21.6	128	16.4
WCA	29	31.8	32	...	7,326	69.3	8,008	9.5	22,915	21.1	90	7.1
PAI	26	—13.3	36	24.1	5,811	— 7.0	7,500	23.0	19,836	3.9	93	3.3
BAL	25	56.3	29	26.1	6,635	77.3	7,389	30.1	19,363	34.2	75	27.1
TTA	22	22.2	27	12.5	5,069	23.1	6,142	7.8	16,696	10.0	72	10.8
SOU	26	52.9	31	29.2	4,878	68.1	5,647	30.8	15,519	39.7	85	37.1
LCA	19	35.7	30	57.9	2,930	32.2	4,788	62.3	10,905	40.6	70	40.0
CEN	12	9.1	16	23.1	2,551	13.0	3,102	25.6	8,293	16.1	41	13.9
Total ...	427	30.6	512	23.4	92,249	46.8	106,610	28.2	294,039	29.2	1,396	22.3
HELICOPTERS												
CHA	19	137.5	19	—24.0	312	105.3	322	—24.6	991	9.0	60	15.4
NYA	9	50.0	12	20.0	207	66.9	246	23.0	681	30.2	31	19.2
LAA	3	50.0	4	33.3	96	12.9	133	35.7	352	23.5	10	25.0
Total ...	31	93.8	35	— 7.9	615	70.4	701	— 3.3	2,024	17.9	101	17.4
INTRA HAWAII												
HAL	29	—23.7	36	— 2.9	5,002	—26.1	5,492	—25.7	15,901	—30.4	96	—16.5
Aloha	24	— 4.0	28	33.3	3,672	— 0.7	4,185	13.9	11,284	—3.1	76	4.1
Total ...	53	—15.9	64	14.3	8,674	—17.1	9,677	—12.5	27,185	—21.2	172	—8.5
ALASKA												
PNA	7	16.6	8	14.3	6,546	31.8	7,538	30.6	23,917	40.5	25	25.0
Alaska	8	—20.0	7	—22.2	8,234	— 6.5	5,348	—24.8	23,269	—7.6	24	—14.3
Reeve	1	...	1	...	741	—13.3	1,197	12.4	2,980	5.8	3	....
NCA	1	—50.0	2	...	421	—14.3	615	11.6	1,414	1.0	4	—20.0
Wien	1	...	3	...	356	—17.0	647	— 0.6	1,352	—8.2	6	20.0
AAA	3	...	4	33.3	284	— 7.2	438	8.7	1,050	4.4	10	11.1
CAA	1	...	2	...	159	16.1	396	5.0	671	—7.6	4	....
Ell	2	—33.3	4	33.3	158	—31.3	207	— 1.4	539	—19.4	9	—10.0
Total ...	24	11.1	31	3.3	16,899	4.2	16,386	1.5	55,192	9.8	85	1.2

AL . CARGO (Ton miles in thousands)

	February Freight		Feb.—Total Scheduled		Feb.—All Services		March Freight		March—Total Scheduled		March—All Services	
	1961	% Change	1961	% Change	1961	% Change	1961	% Change	1961	% Change	1961	% Change
FLYING TIGER	3,815,735	—18.8	3,880,231	—19.5	7,472,001	—5.8	6,363,306	—10.9	6,492,503	—11.2	8,622,061	—15.8
RIDDLE	1,666,019	—13.6	1,756,734	—10.8	6,243,213	205.3	NA	....	NA	....	NA	....
SLICK (C)	.....	....	.....	....	3,942,752	—46.7	.....	....	.....	....	1,223,381	—85.0
AEROVIAS SUD	136,946	—69.8	136,946	—69.8	209,929	—59.0	145,467	—69.4	145,467	—69.4	269,650	—50.5
SEABOARD WORLD	3,287,707	105.0	4,679,833	127.7	5,419,002	—4.2	3,109,472	57.3	4,186,345	65.5	4,930,089	—31.0
Total	8,906,407	2.6	10,453,744	12.4	23,286,897	—1.1	9,618,245		10,824,315		15,045,181	

Note: % change entries reflect comparison with same period in 1960. Ranking of carriers within groups is according to passenger-miles for 1961 to date.

Starting June 11

Delta announces a New Southern Transcontinental Jet Route linking California and the Southeast

6 Jets daily between Los Angeles and Atlanta new faster flight time now only slightly more than 4 hours via non-stop Delta jet! Other daily jet service links Los Angeles and Atlanta by way of Dallas/Ft. Worth and New Orleans. Convenient Atlanta connections to all the Southeast. Los Angeles connections to San Francisco, Seattle, other West Coast cities and Honolulu.

New thru-plane DC-7 service—direct flights between California and Florida, connecting San Diego with Jacksonville and Orlando, via Dallas/Ft. Worth and New Orleans. July 1, Delta initiates service to Las Vegas, and later in the summer to San Francisco.

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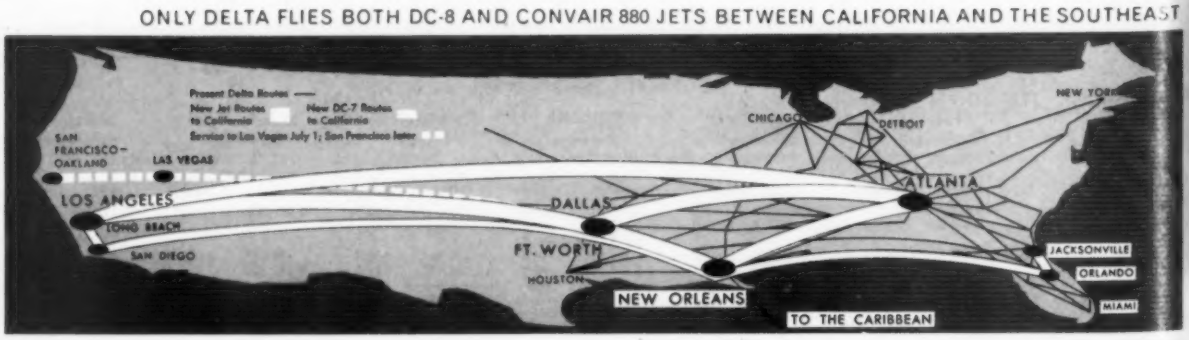

AIRPORTS

Tulsa In $9.5 Million Expansion

By DANNA KUSIANOVICH

Tulsa Municipal Airport—one of the few major U.S. airports which can claim the distinction of having been completely self-supporting since its inception in 1928—is in the midst of a $9.5-million expansion program.

The construction project, main feature of which is a new $4.6 million terminal building, is being financed by a combination of a $4.2 million revenue bond issue, $3.8 million in federal aid funds, and the airport's operating surplus which has been accumulating at the rate of $400,000 a year.

Tulsa's new terminal, which replaces

SPLIT-LEVEL design is featured in Tulsa's new $4.6 million terminal. Restaurant, concession areas and other passenger facilities are on the upper level.

TULSA MUNICIPAL AIRPORT layout is shown above. New terminal area is at lower left, Douglas plant and American Airlines maintenance base at right.

TULSA'S NEW TERMINAL is shown in artist's sketch above. Public areas are housed in the two-story central building, ticketing facilities are grouped in the right-hand wing, and the baggage claim area is in the left wing.

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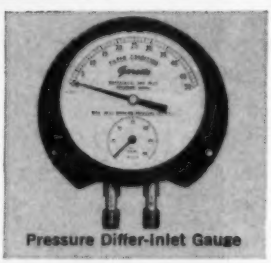
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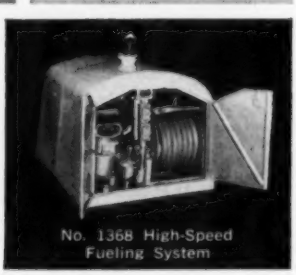
Hydrant Box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a building constructed in 1932, will incorporate 180,215 square feet of floor space, nearly three times the space available in the old terminal.

Designed by Murray-Jones-Murray of Tulsa, the terminal is planned on two levels with a central building incorporating kitchen, restaurant, and office space. Ticketing facilities are located in one wing with baggage claim and car rental areas in another. Concession areas and observation platforms, along with the restaurant, are in the upper level. Floor space breaks down as follows: Concessions, 25,004 sq. ft.; airline rental space, 21,985 sq. ft.; administrative and rental offices, 6485 square feet; public and mechanical areas, 123,217 sq. ft.

Terminal building contractor is W. R. Grimshaw Co. of Tulsa. David R. Graham & Associates, also of Tulsa, is the engineer. Contractor for paving is Mayo Building of Tulsa. Hannaford Construction Co. of Tulsa is contractor for the control tower. Leigh Fisher and Associates served as consultants.

Included in the expansion program are a new taxiway connecting the terminal with the runway complex, a new control tower, and ramps, roads, and parking lots.

Airport Manager Pat Combs estimates that Tulsa's passenger boardings will total 320,000 by 1965 and 400,000 by 1970. After completion of the new terminal, estimated for Sept. 1, the old terminal will be turned into a general aviation facility to serve the 216 aircraft now based on the field.

Tulsa Municipal is the site of several major aviation activities, including the Douglas Aircraft plant, American Airlines' Maintenance and Engineering Center, which includes a new $20 million overhaul plant, and a $5 million facility for the Oklahoma Air National Guard. ■

Airport Briefs

More delays at Dulles—Washington D.C.'s Dulles International Airport, already running a full year behind schedule, appears headed for an opening sometime in 1963. Latest problem is the mobile lounge around which the passenger loading plan is designed.

Unit cost initially was estimated at $100,000 but has since grown to $250,000. Dulles would need about 20, a tidy $5 million in passenger loading stands!

New actions—Sen A. S. Mike Monroney introduced a five-year, $75-million a year U.S. Federal aid to airports bill . . . Canada's Department of Transport has awarded an $8.9 million contract for final stage construction of a new terminal for Winnipeg to be in operation by 1964.

Houston Int'l Airport has followed FAA's lead in slashing air trip insurance rates by awarding Tele-Trip Co. a flat-rate contract at about 25% of gross sales. Rates drop from about 3.5¢ to 2.5¢ for each $1000 of insurance.

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Collins Bolsters Trend in DME Sales

Early orders totaling more than $3 million to airlines, manufacturers and corporate operators represent first return on technical investment in budding navaid market

By PHIL GERACI

The sale by Collins Radio Co. of 138 DME units to United Air Lines last month triggered a surge in airline orders which had reached $3.3 million by *AIRLIFT* presstime. Airlines purchasing this latest navigation aid from Collins included, in addition to United: Eastern, Delta, Northeast, Pacific Southwest, Pan American and TWA.

In addition to the airline orders Collins reported receiving contracts valued at $500,000 from Lockheed Aircraft Corp. and from a variety of corporate aircraft owners.

Following concerted FAA-industry consultation on the question of distance measuring equipment at Atlantic City in March the airlines are proceeding with installation on a voluntary basis. According to the timetable established by ATA prior to the meeting, DME will be installed in jets by January, 1963; in turboprops by July, 1963; in pressurized piston aircraft by January, 1964; and in all other airline aircraft by January, 1965.

Although FAA has urged haste in meeting or exceeding this timetable, no rulemaking has appeared in recent weeks which would supersede the ATA-proposed voluntary deadlines.

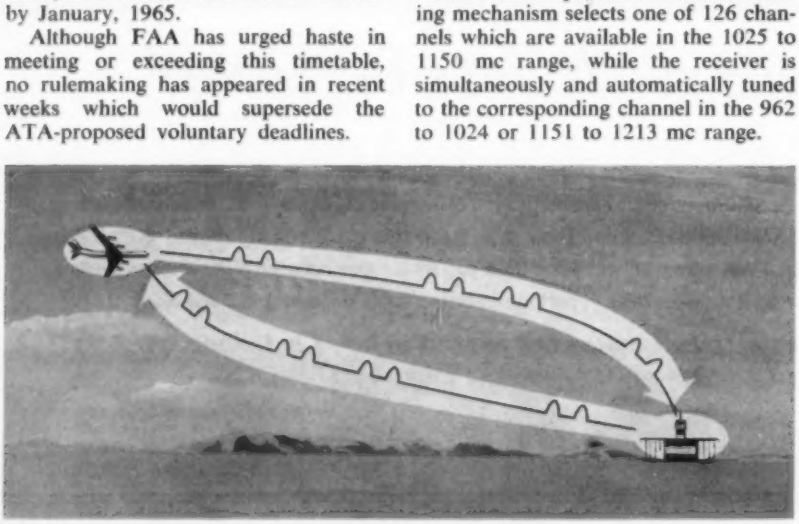
The Collins 860E-1 DME, now in full production at Cedar Rapids, has been designed to meet FAA TSO-C66 (Airborne Distance Measuring Equipment) as well as ARINC Characteristic 521B. FCC acceptance tests as well as FAA TSO tests have been completed and full FCC and FAA certification of the unit has been obtained.

Modular subassemblies

The Collins 860-E-1 is housed in a long ½ ATR (Air Transport Rack) case. It consists of four modular subassemblies plus an IF (intermediate frequency) amplifier and low voltage power supply (see photo).

The weight of the rack-mounted chassis is 37 lbs. The companion 339D-1 distance indicator measures 3¼" wide, 1 3/8" high and 4½" deep, less connector. Designed for panel mounting, the indicator weighs 1.1 lbs.

In operation, the Collins 860E-1 transmits shaped pulses which are coded to form pulse pairs spaced 12 microseconds apart. An automatic tuning mechanism selects one of 126 channels which are available in the 1025 to 1150 mc range, while the receiver is simultaneously and automatically tuned to the corresponding channel in the 962 to 1024 or 1151 to 1213 mc range.



SHAPED AND CODED pulses, transmitted from DME transmitter in aircraft to ground station, are returned to aircraft, decoded, and converted to distance (in miles).

Received by a ground station within the operating range of 0 to 197 nautical miles, the pulses are transmitted back to the airborne interrogator for detection and decoding. Although the reply contains random replies to other interrogators as well as the desired pulse pair, the proper pulses are selected by the synchronizing circuits which measure the time required for transmission and reception and convert the electrical quantity to miles which are expressed numerically on the pilot's distance indicator.

The distance indicator is designed to take up a minimum of precious panel space. Two indicators, used in a dual installation, could be mounted in the panel space normally occupied by a standard 3-in. diameter instrument. Each DME unit is capable of driving multiple instruments if required by the specific installation. Furthermore, analog distance information is supplied by take-off potentiometers and can be used in navigation computers or associated equipment. The 860E-1 also includes an output of decoded bearing information which can be used to drive an external TACAN bearing unit.

Test points convenient

Modular assembly simplifies maintenance. Test points are provided on each subassembly to permit examination of voltages and waveforms. During inspection or maintenance, modules may be operated with extension test cables. Such versatility simplifies troubleshooting and insures long-life dependability.

Collins engineers have gone to considerable lengths to guarantee reliability in operation by providing for consistent functioning within rigid temperature tolerances. Arrangement of modular units is designed for efficient use of cooling air supplied by the radio rack cooling system, drawn in through holes in the dust cover and exhausted through the bottom of the case. An internal

blower is provided for aircraft not equipped with a common cooling system.

Additional reliability is insured by the use of transistors and subminiature tubes wherever possible. Collins engineers report their tests indicate the life expectancy of subminiatures over conventional miniatures to be about three to one. Their figures for transistors and silicon power rectifiers are even better. Silicon rectifiers also reduce heat and this contributes to longer life for all components.

For maintenance, Collins has designed the 578D-1 DME bench test set to be used in conjunction with the Boonton 235A navigation aids test set. The bench test set also has a precision distance indicator for equipment calibration. It can be used with other ARINC 521B DME sets as well as with Collins equipment.

Another piece of test gear—model 475D-1—is a self-contained test unit designed for flight line testing. In operation it simulates a ground station at a pre-determined distance. Automatic cycling permits one operator in the aircraft to perform all tests. The unit is battery powered, and totally transistorized.

Collins advised the following list prices for its distance measuring and test equipment: 860E-1: $7,960; 578D-1: $3,088; 475D-1: under $2,400.

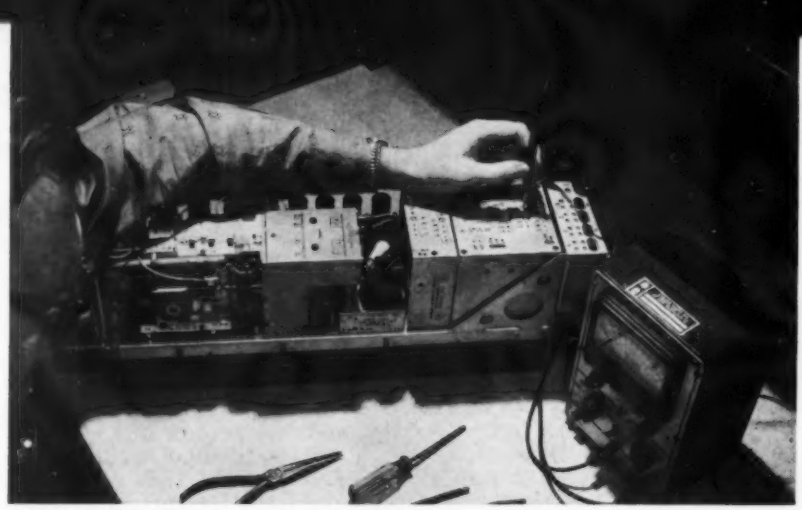
Bright sales outlook

Collins looks forward to greater use of its distance measuring equipment as the airlines' implementation schedule progresses. Following that, the Cedar Rapids firm sees even greater potential in sales to general aviation, particularly for use in turboprop and jet aircraft as they are purchased by executive users.

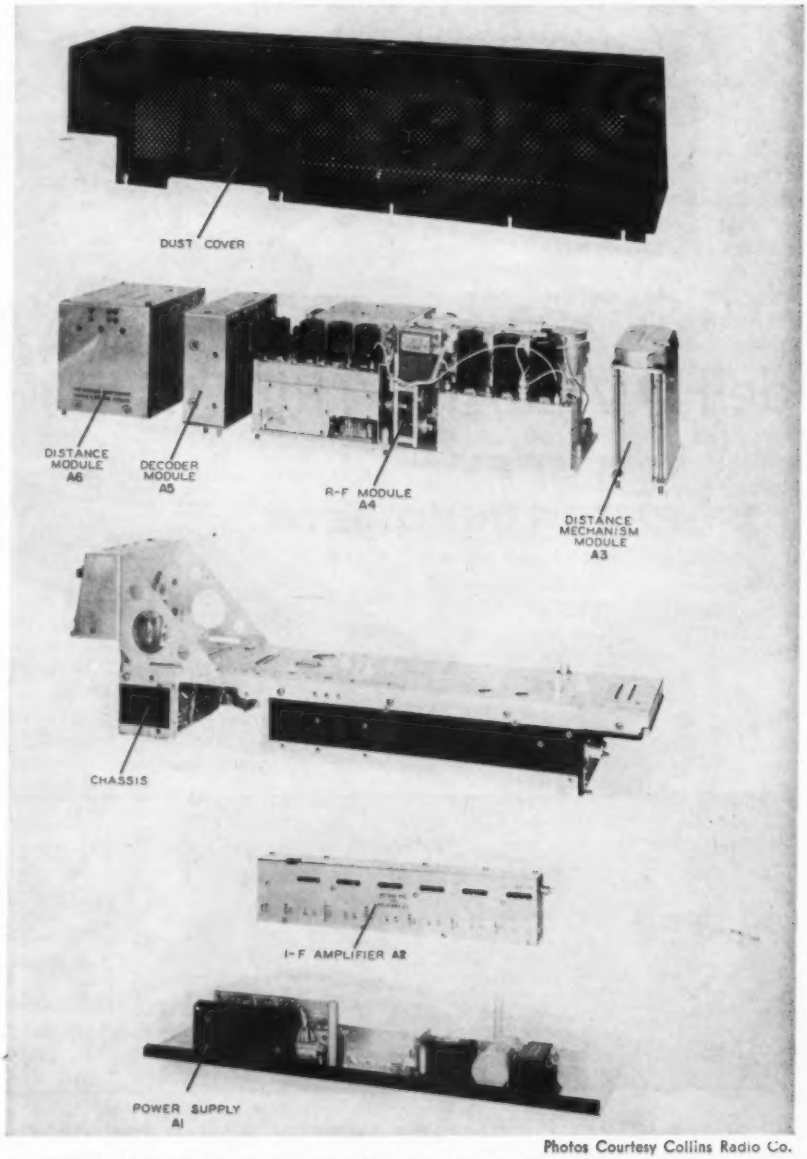
The implementation timetable is geared to coincide closely with the FAA's program of installations. As of early this year only 254 of the 725 VOR ground stations were equipped with DME. Under the present FAA timetable it will be 1966 before all 725 stations are DME equipped. Agency plans also call for installations at 158 new stations by this same date.

In addition to the civil DME stations now ready or under construction, distance measuring service is available from more than 225 military TACAN stations. Recent FAA tests of shipboard TACAN aboard the Coast Guard cutter Androscoggin in the North Atlantic indicate a potential for DME service well beyond the shores of the continental United States.

With such possibilities growing greater every day, Collins looks forward with considerable optimism to the future of this latest innovation in air safety. ■



MODULAR DESIGN is evident in photo above, which shows 860E-1 DME with dust cover removed. Technician connects meter to test point provided on module.



Photos Courtesy Collins Radio Co.

COMPONENTS of Collins 860E-1 DME are shown above. Interconnecting wiring and plug-in assemblies are integral with module chasses, facilitate assembly.

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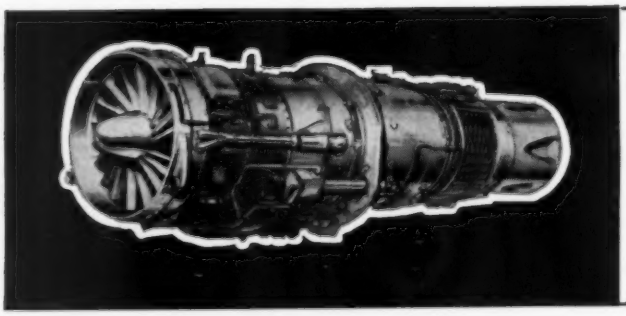

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Scramble! Pilots Feel The Squeeze

By CAPT. E. J. BECHTOLD

This is not the "scramble" associated with a military jet intercept, but the consequences could be of a similar magnitude if we don't start UN-scrambling—and SOON. This scramble is the conglomeration of long-recognized and oft-repeated problems we must face up to realistically in the aviation industry. We hope to pinpoint these obstacles, where the responsibility lays, and some suggested solutions in this and future columns.

Where does one start in analyzing our present troubles? It is easy to criticize and pass the buck, but let's face it —the industry *is* regulated. Those regulating can't do it alone to be sure; but without leadership, those of us integrally woven into this maze are finding it more and more difficult to make sense as to where we are going.

There has to be a starting point and this is where the finger should be pointed initially—whether it be at those who conceive, those who write, those who enforce, or those who review the regulations. We, who fly, for fun, business, or professionally, are over-regulated to the point where a legal background is almost a prerequisite to the successful completion of a flight.

FAA sponsors a hazard

But this is now reaching the non-joking stage. (If you don't believe it, check with any one who has been burned.) Keeping up with the constant flow of revised operating procedures and regulations put out by the FAA is creating a psychological hazard which results in pilots being more concerned about the legality of the operation than the operation itself!

The phrase "antiquated traffic control system" has been used so frequently it is almost meaningless. Nevertheless it is a fact that this system we are operating is based essentially upon concepts developed in 1938—23 years ago. How does one reconcile this in view of the speed differential from 160 mph of the DC-3 to the 600 mph of our present jet equipment?

And, just to emphasize the point, look into your crystal ball and gaze upon the speeds of Mach 2 or better in another decade. We need action now —drastic action—which should have been taken five years ago to preclude our operating, come 1970, under a system which at that time will be 25 years behind the times.

True, funds have been expended in research & development; different approaches have been tried; thousands of manhours have been devoted to discussions—starting in the days of CAA, through the initial phase of FAA, to date—but the simple, bitter, frustrating truth is we still have a makeshift, patched-up system that is straining from obsolescence, no matter how it is viewed.

Action coming, we hope

The new Administrator, Mr. Halaby, presumably is acutely aware of these problems, having already designated a high-level committee to investigate them. This committee in addition has been directed to propose a program for early implementation which will provide not only short-range practical improvements, but long-range planning as well. As we understand it the industry will be thoroughly canvassed for assistance and guidance. Hopefully, this procedure will be followed. Of equal importance, the users, we hope, will not regard this request for participation lightly.

Research & development programs in other areas are also under the gun for re-evaluation by Mr. Halaby and his associates. As an eye opener, perhaps such long-sought aids as proximity-warning indicators, accurate radio navigational aids and airborne equipment, frangible blast fences, improved, reliable flight recorders, 3D-radar, voice recorders, reliable, sensitive altimetry, windshield wipers or some sort of precipitation removing device that works —to name a few—will become realities.

The airport development program has lagged behind the others. Hazardous approaches, continued piecemeal repair programs, inadequate lighting and navigational aids, short runways and lack of over-runs—again to cite a few—have caused numerous missed approaches, diversions, incidents, accidents, and lots of passenger inconvenience, not to mention the economic penalties.

And don't forget another old and often told story—as these airplanes get bigger and heavier and faster, without improvements in the areas noted, the margins get thinner. If we keep squeezing long enough the inevitable happens—and just to keep the record straight, this "squeeze" is another vital factor in the "scramble."

Compromise is a word closely associated with every facet of this industry. 100% of anything apparently is beyond our reach. As a consequence, we have fallen into the pattern of readily accepting settlement for less than the ultimate regardless of whether it be better instrumentation, better seats, more comfortable cockpits, longer runways, collision avoidance, improved navaids, realistic ATC procedures and communications, flow of information, realistic regulations, ad infinitum.

The "calculated risk" *is* part of flying. We do not challenge it nor are we fearful of it—but experience indicates it must be monitored closely, not only to enhance, but to preserve and maintain the necessary safety margins. To permit this concept to "spill over" to the public would be a mistake. But if positive, corrective action in known trouble areas continues to be dependent on accidents, this could occur.

Decisions based on *working* knowledge of the present problems and anticipated needs must be translated into practical answers. Without proper tools the job is impossible; without proper rules and procedures it is inefficient and becomes marginal. ■

BECHTOLD

Captain E. J. "Ed" Bechtold, a 16-year veteran pilot with Eastern Air Lines, takes over AIRLIFT's Pilot Talk column with this issue. As an active proponent of improved flight safety, Capt. Bechtold played an important role in the cockpit layout of the Lockheed Electra and more recently was named ALPA's regional safety representative in New York.

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CLARKSON

IN THE AIRLINES

Manuel Sosa de la Vega named to newly-created post of commercial director of Mexicana Airlines (CMA), in charge of sales and financial departments. He has been asst. sales mgr.

Harold Graham, who resigned recently as president and director of Cunard Eagle Airways (Bermuda) Ltd., appointed cargo sales director of Pan American.

Continental promoted **Richard G. Schorling** to v.p.-purchasing and property, **George J. M. Kelly** to asst. v.p. and secretary, and **Michael W. R. Meyer** to asst. v.p.-advertising.

William F. Prigge, 24-year veteran with American and most recently asst. v.p.-passenger service, joins National as asst. v.p.-sales and services.

William J. Mitchell promoted by Mohawk from asst. v.p. to v.p.-market development.

C. L. Tabor, v.p. and asst. to the president of Ozark, named v.p.-schedules and tariffs.

Allan R. Moulton II, who has been director of sales and services for Aerodex Inc., named director of surplus sales of American.

F. E. Coufal, Northwest's domestic sales mgr., named director of commercial sales.

Chicago Helicopter Airways promoted **Clyde E. Sundberg** from supt. of stations to traffic and sales mgr.

G. Fred Pelham promoted by New York Airways from asst. traffic and sales mgr. to director of sales. **Robert H. Miller,** Northwest's district operations mgr. at Idlewild, joins NYA as director of transportation services.

Three promotions in United's purchasing and stores dept.: **Richard A. Young** from supt. of supply research to asst. to the v.p.-purchasing and stores; **H. W. Bentson** from administrative asst.-business management to surplus and transportation mgr.; **J. M. Baird** from project engineer to supt. of purchase contracts.

Braniff's purchasing and stores dept. promoted **Charles Mathews** from purchasing agent to gen. mgr.-purchasing; **Jack Curry** from asst. to the purchasing agent to gen. mgr.-stores; **Tom Ennis** from mgr.-purchasing dept. services to asst. to v.p.-purchasing and stores.

George Moulton, former interline and agency mgr. of West Coast, named to a similar post with Bonanza.

Curtis W. Lawler promoted by United from chief of technical services to accessory and electrical components mgr. at San Francisco maintenance base.

Richard J. Trainor, with Seaboard for eight years, named director of forwarder and agency sales. **Robert Williams,** former gen. mgr. of Mercury Air Freight, joins Seaboard as director of customer service.

Stan Brunt named director of customer relations for Piedmont, and **Harold L. Warner** appointed director-flight services.

Herman Wedemeyer promoted by Hawaiian's public relations director to beline sales mgr., succeeding **John F. Heiner,** resigned. **Pat Riley** resigned as Hawaiian's public relations director to become v.p.-public relations of Vance Fawcett Associates ad agency, Honolulu.

AMONG THE SUPPLIERS

Christopher Clarkson named president of British Aircraft Corp. (USA), formed recently by British Aircraft Corp. Ltd. Company headquarters are 399 Jefferson Davis Highway, Arlington, Va. Clarkson, who was U.S. representative of Vickers-Armstrongs, will maintain offices at 10 Rockefeller Plaza, New York. Other officials: **Murry P. White,** executive v.p.; **Frank C. Hydes,** director of technical sales; **W. M. Ehart,** press and pubrel mgr.

P. J. Waite named sales mgr. of aero division of Rolls-Royce of Canada Ltd. He has been senior sales engineer.

UAL-CAP MERGER PLAN

Realignment of personnel and establishment of a new regional setup, to become effective when the United-Capital merger is final, are revealed by United.

Here's how the post-merger organization will look:

Transportation services: This is UAL's biggest administration, including both ground operations and passenger service. There will be eight regions: eastern, headquartered in New York; Great Lakes, Pittsburgh; southeastern, Atlanta; midwestern, Chicago; mountain, Denver; southwestern, Los Angeles; western, San Francisco; northwest, Seattle.

D. F. Magarrell, senior v.p., heads transportation services, with O. C. Enge as v.p.-passenger service. O. T. Larson switches from v.p.-ground services to v.p.-transportation services operations (west) at Denver, with four regions reporting to him. Fred Brown, now assistant v.p.-transportation services, becomes assistant v.p. and general manager of transportation services operations (east), Washington, D.C., and also has four regions. Marvin Whitlock, Capital's senior v.p.-operations and maintenance, is in charge of aircraft and equipment maintenance.

Personnel: Headed by senior v.p. R. F. Ahrens, this division has the same regional setup, except that headquarters of its southeastern region will be Washington, not Atlanta.

Flight operations: Two Capital employes will hold important posts under senior v.p. D. R. Petty. Flight manager of air traffic control will be J. D. Smith, Capital pilot, who has specialized in traffic control matters as a regional chairman of ALPA's safety committee. C. E. Luther, Capital's director of flight operations, will be Petty's assistant. Other positions, filled by UAL officials: assistant v.p.-flight operations, C. M. Christenson; v.p.-communications, J. G. Hodgson; v.p.-flying, I. E. Sommermeyer; director-flight operations training, J. G. Brown; director-flight standards, C. F. Skannal.

Engineering and maintenance: Under senior v.p. J. A. Herlihy are assistant v.p. P. A. Wood; L. T. Long, personnel relations; W. C. Mentzer, v.p.-engineering; G. E. Keck, v.p.-base maintenance; R. D. Kelly, director of technical development; and E. P. Buckthal, who will head engineering and maintenance in Washington.

Sales and advertising: Headed by senior v.p. R. E. Johnson. There will be seven regions—east, Great Lakes, southeast, midwest, southwest, west and northwest. Regional sales managers will report to H. J. Merchant, v.p. and general sales manager. R. Q. Chalfant, Capital's v.p., is director of passenger sales planning. Other departments, headed by UAL officials: cargo sales planning, R. L. Mangold, director; sales services, B. B. Gragg, v.p.; advertising, J. M. Clampitt, director; reservations service, M. L. Perry, director.

Finance and property: Executive v.p. Curtis Barkes has D. C. Meenan, v.p.-facilities and property; D. V. O'Leary, v.p.-purchasing and stores; R. E. Bruno, v.p. and treasurer; G. R. Harms, comptroller.

HALABY's "call-director" phone often makes possible remoted staff conferences.

COL. STEPHEN W. HOLDERNESS, center's "builder," checks a key management tool, daily "Alert Bulletin."

FAA REPORT

Halaby 'Command Post' Keeps Brass Informed

By BRAD DUNBAR

FAA Administrator Najeeb Halaby in his first weeks in office already has "surrounded" himself with agency problems.

The young former test pilot has converted a small conference room near his office into a virtual FAA command post —a "management information center"— putting bureau-by-bureau vital statistics, programs and problems almost literally within arm's reach on all four walls.

A unique extension of FAA's existing quarterly review process, Halaby's control center now serves as an effective coordinating point for his top aides. His bureau chiefs check it daily for his personal schedule and for his daily "Alert Bulletin", a summarized morning briefing of industry, government and agency news. His "operating group"—primarily heads of Flight Standards, Air Traffic Management, Facilities and Materiel and Research & Development—meets there regularly.

Halaby has seized on latest communications aids to permit utmost use of the center in day-by-day direction of FAA. A "call director" set permits quick conference phone conversations with key people. A small microphone-receiver unit permits phone calls involving one or more persons from any point in the room; operating group members "met" with Halaby in this way recently while their boss was in Florida for a speech.

With the walls covered and the conference table topped with a U.S. airways map, where to go with future material? "Well," says Halaby with his eye on a bare two feet of wall space just below the ceiling line, "there's always Project Horizon . . ." ■

FAA Official Photo

"360 DEGREES of programs and problems" cover walls; even table top is utilized for a U.S. relief map overlaid with the airways system. Charts and graphs are updated periodically, with latest entries highlighted with arrows.

Rulemaking Unhindered By Task Force Studies

The "study and plan" approach of the Halaby administration pending completion of assorted task force reports has had little apparent effect on FAA's rulemaking machinery. New proposals as well as action on long-standing docket items are reflected by:

• Time Between Overhaul (TBO) for engines, propellers and accessories based on adjusted ratios of in-flight failures for each 1000 hrs. of engine time (61-6): Highly controversial, this statistical effort to achieve a measure of TBO standardization with a meaningful air safety yardstick would (1) permit 200-hr. turbine engine TBO increases for .1 failures or less per 1000 hrs. on turbine engines, and 100-hr. increases for a carrier record of up to 1.5; (2) maintain existing TBO beyond .15; (3) make the carrier subject to a 100-hr. TBO reduction when its record slipped past .2 failures/1000 hrs. Comparable piston-engine performance levels would be .4 for a 100-hr. increase, .4 to .6 for no change, and beyond .6 for a 100-hr. reduction. Comment time was promptly extended into this month.

• Final rulemaking abolishing carriers' authority to waive a landing penalty of 100-ft. on ceiling and one-half-mile on visibility on a pilot with less than 100 hrs. on the transport he is flying: An outgrowth of the 1959 crash of a new American Airlines Electra in the "Black Hole" of Ryker's Channel off LaGuardia, the rule had been proposed just a year earlier.

• Another final rule extending turbine transport flight recorder requirements to cover training, flight check and most ferry and flight test as well as normal payload operations: Proposed late last year (60-18) to give investigators the same help in probing the increasingly frequent jet training crashes as they have in scheduled turbine accidents, the rule in its final form eases an original go, no-go provision, and grants airline requests for certain ferry and test flight exemptions. ■

VIOLATIONS

•**Pacific Air Lines** has paid FAA a $5000 compromise civil penalty for a 13-count violation action charging a series of maintenance and airworthiness incidents, pilot certificate and proficiency delinquencies, and failure to keep pilot training and maintenance manual material up to par.

The violations charged dated back to Aug. 1, 1958. FAA first proposed a $20,000 fine, claimed PC's defense offered "nothing in exoneration and very little in mitigation," yet later accepted two $2500 payments in full settlement of the case.

• **TWA is still contesting** the $1000 civil penalty proposed by FAA's enforcement division for what it terms the airline's "principal responsibility" for improper clocking of a Constellation that fatally injured a flight engineer. The carrier has not paid the fine, as erroneously reported to *AIRLIFT* by FAA (April), but is awaiting an agency reply to a Dec. 2, 1960 letter asking that the action be withdrawn.

• **In a pilot enforcement case,** the agency revoked the certificate of Alaska Airlines Capt. James R. Long—and banned

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any new ATR for him for six months after the May 5 certificate action effective date—for his Feb. 22, 1960, accident in which he failed to pull out and cracked up his DC-6 after passing through the radar approach minimums at Elendorf AFB.

• **The director of operations** and chief of maintenance for Samoan Air Lines between Jan. 12 and Sept. 3, 1959, **Marvin L. Cox,** had his mechanic's certificate revoked for a series of incidents, including having a mechanic's helper "smear grease on the grease fittings of an airplane to give the appearance" it had been serviced.

• **Other enforcement actions:** A 90-day ATR suspension, March 29 to June 27, for **Henry P. Goodman,** Miami, pilot-in-command of an **Argonaut Airways Corp.** C-46 who took off into a 100-ft. ceiling over Detroit Municipal Airport Jan. 27, 1960, although his company's minimum for the takeoff was 300 ft . . . A 60-day certificate suspension on **Capt. H. M. Harkcom** Tulsa, pilot-in-command of an **American Airlines** Electra which FAA said made 50 and 300-ft.-high passes over a congested area near Harvey Young Airport, Tulsa, Sept. 20, 1960 . . . Sought U.S. District Court action in southern Florida against **Capt. Dan V. Wheeler,** Miami, pilot-in-command of an **Eastern Air Lines** Constellation, whom it blamed for a near-miss between the Connie and an AF T-33 in the MacDill AFB control zone April 6, 1959 . . . Suspended the certificate of **Capt. Charles G. Fredericks,** Miami Springs, who failed an Oct. 24 physical examination, from April 10 until he takes and passes an eye test and a special flight test . . . Sought U.S. District Court action in Hawaii against **Hawaiian Airlines Capt. Wallace A. Dyer,** whose straight-in approach to uncontrolled Kona Airport Nov. 9, 1959, resulted in two airliners approaching opposite sides of the same runway; the **Aloha Airlines** F-27 which had made a circling approach saw Dyer's Convair and pulled up . . . A $1-000 compromise fine against **Western Air Lines** for two 1959-60 maintenance incidents involving Electras dispatched with an inoperative generator and a malfunctioning propeller position indicator light . . . A $1000 fine against **Riddle Airlines** for flying "non-essential cargo and personnel"—8000 lbs. of cargo and four Riddle employes—on a special DC-4 ferry flight from New York to Miami in August, 1960 . . . A $500 fine paid by **Lycoming Division** of **AVCO Corp.** for turning out an engine with a missing crankshaft roller bearing which the agency said caused a forced landing of a Piper PA-24 . . . Emergency certificate action against **Capt. Charles G. Fredericks,** Miami Springs, Fla., for an Oct. 21, 1960 flight for **Dispatch Service, Inc.,** without a valid first or second class medical certificate . . . A $350 fine on **United Air Lines Capt. Robert H. Boyce,** pilot-in-command of a DC-7 whose first officer undershot by 290 ft. at Epply Field, Omaha, March 8, 1960, damaging the aircraft and destroying five approach lights. ■

HOEKSTRA

A key personnel transfer has meaning for the industry in the shape of future programs of FAA's "new" Bureau of Research & Development: Harold D. Hoekstra, knowledgeable "old air safety hand" from CAA and FAA's Transport Aircraft Projects Staff (Bureau of Flight Standards), is heading up the Aeronautics Branch of R&D's Systems Engineering Div.

Hoekstra's research effort will center on some of the safety problem areas which the pressure of immediate air traffic control, navigation and communications needs always threatens to shove clear off FAA's test lab floor. He has already reported to R&D after serving as FAA's chief spokesman at IATA's Montreal symposium on the supersonic transport.

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NEWS IN BRIEF

EQUIPMENT

Order lull ends—A marked stepup in turbine buying activity during the past month brought forth 13 major deals involving an estimated $375 million in new business.

Heading the list was TWA's $187-million order of 20 Boeing 707-131B and six 331B turbofans and a lease of four fan-powered 720Bs. TWA will get the latter starting in October. Delivery of -131Bs will spread from March to October 1962 and -331Bs from July to September of '62.

American Airlines signed a letter of intent for 25 Boeing 727s for 1964 delivery.

National Airlines purchased seven turbofan DC-8s at about $40 million including spares with delivery extending from October, 1961, to November, 1962, thus reopening the DC-8 line at Long Beach to new business. Douglas had built 10 DC-8s on speculation, but the NAL order more than exhausts the number of remaining unsold positions.

Japan Air Lines also will order another DC-8, its sixth, to replace one damaged beyond repair in a landing at Tokyo on April 24.

British United Airways became the first airline to order British Aircraft Corp.'s BAC-111 (see page 23). Ozark Airlines has a letter of intent for five 111s . . . British European Airways ordered three Armstrong Whitworth Argosy airfreighters bringing total number of Argosies on order to 63.

Pakistan International Airways ordered three Boeing 720Bs at about $15 million. First will be delivered in December, remaining two in the fall of '62.

Air India confirmed its plan to order two and **BOAC** three Boeing Intercontinental models. **El Al** purchased two Boeing 720Bs at about $14 million for delivery early in 1962. **Cunard Eagle** signed up for two-420s at $15.2 million for delivery early in 1962 and optioned a third. Engines are Rolls-Royce Conways.

Japan's All-Nippon Airways is purchasing 25 YS-11 twin Rolls-Royce Dart-powered turboprops (See *AIRLIFT*, Nov. 1960) from Nihon Mfg. Co. for 1964-1966 delivery . . . **ALA Austral,** Argentine independent airline, ordered four Fokker F-27s for March-April 1962 delivery.

Trans Caribbean Airways contracted for one fan-powered DC-8 and optioned a second. First delivery: October or November, 1961. TCA is considering a 174-passenger interior.

Resales—Riddle Airlines purchased three DC-7Cs from Douglas expanding its convertible passenger/cargo fleet of -7Cs to ten. Aircraft are being modified by Douglas to 40,000 lb. payload capability and will enter service starting in mid-June.

New designs—Lockheed Georgia Division has applied to FAA for certification of the C-141 optimum civil-military cargo jet under the commercial designation Model 300. Its initial USAF contract calls for five prototypes.

HELICOPTERS

A guide for manuals—Air Transport Assn. is contacting helicopter manufacturers with plans to make its Spec. 100 covering technical data applicable to helicopters.

Service at SFO—San Francisco & Oakland Helicopter Airlines begins a 28-flight daily schedule June 1 with two Sikorsky S-62s, expanding to 70 flights on June 15. New carrier is headed by M. F. Bagan, formerly of Los Angeles Airways.

NEW BUSINESS

Kaman Aircraft has formed **Kaman Skymotive,** a new fixed-base operation at Bradley Field, Hartford, Conn. . . . New jet engine and accessory overhaul plant of Rolls-Royce subsidiary **Motores Rolls-Royce S.A.** at Sao Bernardo (near Sao Paulo) has been dedicated.

A group of former **Kollsman Instrument Corp.** executives headed by Everett H. Schroeder has formed **Astek Instrument Corp.** located in Armonk, N.Y. Other officials are J. H. Anderson, director of engineering; H. L. Freye, treasurer; and, Victor E. Carbonara (ex Kollman president), director and advisor.

Garsite Products has contract for fourteen hydrant fuel servicers to be installed at Minneapolis-St. Paul airport.

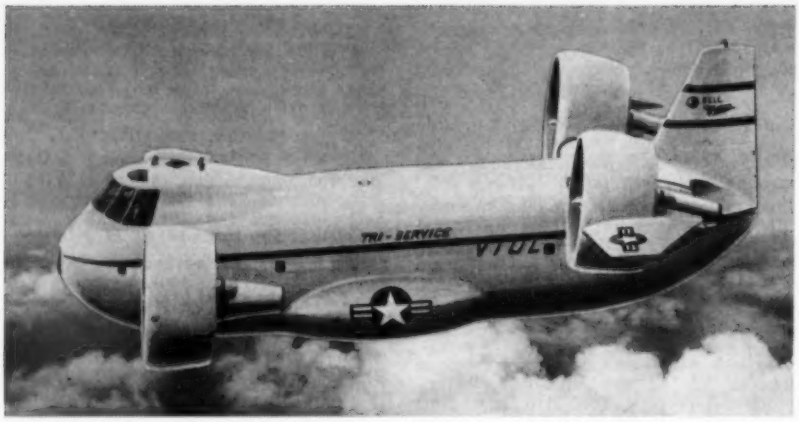
Garrett Corp. will provide cabin air conditioning systems for Boeing 727 aircraft. Garrett Corp. presently provides equipment for 707s and 720s.

Hardman Tool and Engineering Corp., Los Angeles, will supply passenger seats for 22 Convair 880 and 990 jet aircraft.

A CINDERELLA setting in reverse was enacted in Atlanta at 12:01 a.m. on May 3 as operations shifted from an outdated, overworked and unsightly maze of corridors to this sparkling new $20-million facility.

It provides 52 loading positions to handle 524 daily scheduled flights of six airlines; 450 ft. of ticket counter space; luxurious Dobbs House restaurant facilities; a bank; a sky lounge where passengers may buy privacy and comfort in upholstered chairs through a 256 turnstile; and, as an added attraction, a $35,000 mobile by sculptor Julin Harris depicting in abstract a combination of the rebirth of Atlanta from ashes in 1864 and the speed of jet air transportation today.

Handling 2.5 million passengers a year, the new facility will take in $2.8 million in revenues in the coming year. In design, beauty, efficiency or whatever the yardstick, Atlanta's new terminal ranks with the best the world over.



FUTURE FEEDERLINER? This artist's sketch depicts Bell-Lockheed entry in U.S. military's "tri-service" utility V/STOL competition, results of which are expected during June. Four ducted Hamilton Standard props would be powered by GE T64s interconnected to a common shaft. Competition calls for a 36-passenger capacity, 10-minute hover capability, 350-mph speed and 1000-mile plus operating radius.

ELECTRONICS

Orders for $400,000 in FD-105 integrated flight systems and DF-202 automatic direction finder systems have been placed with Collins Radio Co. by Eastern Air Lines. They will be used on Boeing 720 aircraft.

Collins also reports orders totaling $694,765 from Sud Aviation for airborne communications equipment and related gear to be installed on Caravelle aircraft. Delivery will be made by Collins Radio Co. (France) S.A.R.L., a Collins subsidiary based in Paris.

Hazeltine is developing TV marker handoff equipment for the FAA to be installed for testing at FAA's Atlantic City test center. The equipment will permit targets identified on one display to be simultaneously displayed on other indicators for a more positive control of traffic.

To avoid interference with navaids, portable transistor radios have been banned from all Royal Australian Air Force aircraft. In the U.S., the FAA also has banned the use of portable transistor FM radios in civil aircraft, effective May 25. The FAA rule does not cover AM portables, whose oscillators function in the 455 kc range, well below the VHF region of 108-118 mc allocated to aircraft navigation instruments.

New York Airways Vertol V-107 helicopters, due to enter service next month, will be equipped with dual installation Bendix VHF communications systems.

MISCELLANY

Amexco at NEA—Northeast Airlines began accepting American Express Credit Cards for air transportation charges effective May 17.

New deal on TEAL—Australian government has agreed to sell its half ownership of Tasman Empire Airways Ltd. to New Zealand for $2,462,477 payable by March, 1965.

Two suits for labor—Southern Airways has filed a $7 million damage suit against Air Line Pilots Assn. charging 13 counts of libel in pamphlets and other material distributed since ALPA went on strike last June . . . Western Airlines filed a $1 million damage suit against the Flight Engineers Int'l Assn. for alleged illegal walkout of 123 engineers February 18. WAL subsequently discharged the strikers.

A Slick comeback—After 42 months of suspended common carriage operations, Slick Airways plans restoration of service on September 6. It will use three 1049Hs initially in service from Boston to Los Angeles/San Francisco via New York, Philadelphia, Detroit, Chicago and Dallas/Fort Worth.

CAB member Chan Gurney suffered a heart attack in the Board room on May 4 and at presstime was recuperating at Washington D.C. Hospital Center.

Mohawk Airlines is designated as Repair Station No. 4265, maintaining complete installation and maintenance facilities at the modern new Headquarters Plant in Utica, New York.

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Perpetual Maintenance Pays Big Dividends to Continental Airlines

By BILL WILKS

"Perpetual maintenance" of its fleet of five Boeing 707s means the difference between profit and loss to Continental Airlines.

"If we had to take one aircraft out of service for overhaul, there would go one-fifth of our jet revenue for a week," says Joe Martina, head of Continental's jet maintenance base at Los Angeles. "As far as we know, we're still the only carrier operating this way. We couldn't otherwise."

After two years of operation with perpetual maintenance, Martina and Herb Jones, supervisor of production planning, draw these conclusions:

- Continental may pay a bigger labor bill than it would with a conventional maintenance program.
- But this is more than compensated for by the fact that Continental's jets stay in service, each averaging utilization of more than 11 hours daily, block to block.

"And we have the lowest break-even load factor among domestic 707 operators, sometimes getting as low as 42 per cent," Martina says.

Joe Martina, Director of Continental's Maintenance Base

Air Force interested

The Air Force recently has been inspecting Continental's program to see if this type maintenance can be applied to the KC-135 tanker. At least half a dozen other airlines also have been giving it a close look, and, according to The Boeing Co., which built the 707 with perpetual maintenance in mind, are "working toward it."

One of Continental's 707s has logged more flying time than any jet in domestic industry—more than 7600 hours. Two others are approaching that mark.

"We follow the same basic 707 overhaul program as other operators," Martina said. "But where the others pull a jet out of service for five or six days every 2500 to 4000 hours, we've broken overhaul down into lesser jobs that can be done during the regular hold time. We see each airplane every fifth day, so everything is gauged to that."

Normal maintenance hold time for each aircraft is one 12-hour period every five days. Each jet also overnights at the maintenance base for one eight-hour period during that time, allowing crews to make component time changes and take care of pilot squawks. Starting June 11, added trips will eliminate the eight-hour turn around, leaving one hold period in which to do all work.

"We have a 14-man overhaul crew which we try to keep busy each and every night with an average of 50 manhours of work," Jones said. "If problems arise, we can schedule about 100 manhours. Both the overhaul and the line maintenance crews work on the airplane at the same time wherever possible."

Jones figures it takes about 20 visits, or 100 days, to accomplish a 2500-hour overhaul. But he must "build in" more visits than that in his schedule to take care of the overhaul, allowing for unforeseen situations such as when weather forces a flight to put down at Ontario, Calif., about 80 miles east of Los Angeles.

When that happens, he loses that visit to the maintenance base. Therefore, Jones sets a certain "buffer," building in about 120 days. He also includes enough time to accomplish the 5000-hour overhaul along with the 2500.

"We're always working ahead of ourselves," he said. "You can't let any-

MECHANICS demonstrate attention to detail paid under Continental's continuous maintenance program. Each 707 is hangared for 10 hours every fifth day.

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thing go right up to the hilt. Overhaul must be completed before 2500 or 5000 hours. We might complete a 2500-hour overhaul at 2400, and a 5000 at 4800.

'Buffer' of 120 days

"The procedures for the overhaul program have been broken down into areas of the airplane that are small enough to allow each job to be done in one maintenance hold. Compatible jobs that do not require excessive manhours will be scheduled together so that the total manhours can be held down.

"For example, we have a 2500-hour check that opens up a portion of the baggage compartment. We have a 5000-hour check that opens up the same portion of the compartment, plus a little more. When the 2500-hour work is due, we do only that, of course. When the 5000-hour is due, we make sure we accomplish the 2500-hour check in the same area. This eliminates opening up time for one complete check. We can cut down as much as 30 manhours this way.

Proper planning essential

"The rest of it is nothing but a matter of keeping time on each portion of our checks and proper planning and scheduling of the work to be done.

"Occasionally, we do get trapped," Jones admits. "Then all we can do is call in our people on overtime and get the job done. Uusually, this would be on line maintenance where we would have to schedule a periodic (240-hour) check, a 400-hour check and a 1200-hour check all at the same time. This would happen because of some unforeseen problem arising which leaves us no way out, such as a diversion of an airplane to Ontario. Instead of sending our men out there to attempt to get the job done, we would wait until the aircraft came to Los Angeles and then call them in on overtime to do it, *if* the check time would permit.

"Overtime, by the way, is constantly decreasing. It may be down one month and up the next, but on the whole, we require less and less. You might call that our learning curve."

A major part of Jones' juggling act is keeping overhaul work from conflicting with routine maintenance.

"If we have a landing gear retraction on that portion of the overhaul that is due, we would *not* schedule this to be done with a periodic check or an engine change, since the aircraft would be on jacks, making it difficult or impossible for some men to get their work done. It would be done with a routine (80-hour) check.

Jones reports less "waste" of time on components under the perpetual maintenance program.

PRODUCTION PLANNER Herb Jones (right) checks jet exhaust noise suppressor with lead mechanic J. D. Moore.

"Operators using the block method may replace individual components which have been changed only recently due to failure," he said. "They are changed regardless, and then must be overhauled and start all over again in time. Under our system, we can repair a component and return it to service to use up the balance of time. In order to keep the work load smoothed out, and avoid overtime, time changes are scheduled earlier if necessary. We do try to keep time changes the same for the engine."

There are no significant seasonal changes in Continental's maintenance program.

Continental also operates four DC-7s, on which conventional maintenance and overhaul methods are used. Martina and Jones believe perpetual maintenance could be applied to DC-7s, or almost any other craft, but that "you have to start out with new or freshly overhauled aircraft."

"I think it would be difficult for other lines now using the block method on 707s to convert to perpetual maintenance," Martina added.

While Jones thinks perpetual maintenance of jets is a must for small and medium-size fleets, he believes there may be a point reached in fleet size where the conventional method is more practical and economical.

"This may be where the airline can afford to have one aircraft in overhaul at all times, keeping an overhaul crew busy the year around," he said. "I'm sure our program costs us more in labor. Our crews are constantly repeating certain operations, opening and closing the same areas of the aircraft over and over again."

However, Martina and Jones agree that they personally would stick with perpetual maintenance no matter what fleet size Continental might reach. ■

For further information on items mentioned in Equipment World, write: Readers' Service Dept., Airlift Magazine. 1001 Vermont Ave. N.W., Wash. 5, D.C.

NEW PRODUCTS

All-Purpose Doppler

A lightweight doppler navigation set described as suitable for all types of aircraft is being shown by Ryan Electronics at the Paris Air Show, being held in France through June 4. Known as RYANAV IV, the doppler unit is designed for operational requirements of aircraft ranging from drones and helicopters to supersonic jets.

Totally self contained, the 13,300 mc unit will accommodate speed ranges from minus 50 knots to plus 2000; altitudes from 0 to 70,000 ft.; drift velocities from 0 to plus or minus 300 knots; ground velocities from minus 50 knots to plus 2000; ground track from 0 to 360 deg.; and vertical velocities to 60,000 ft. per minute.

Fire Boat

Fire protection and crash rescue for airports bordering on the water is provided by Safety Jets, Inc. in the form of a jet-powered fire-fighting boat dubbed "Little Squirt" by its Dallas, Tex. manufacturer. The boat jets water from five hoses at more than 1000 gals. per hose per minute. It can travel at up to 50 mph and is highly maneuverable. It can spray and maintain almost full speed simultaneously.

A low silhouette permits the craft to slip under piers and other obstructions. The lack of a conventional propeller permits it to function in as little as three inches of water. Further information is available from the manufacturer.

Test Unit

The Hypot Model 4300 high voltage breakdown test set (30kv) is offered for insulation testing of ignition harnesses on the JT3-D-1 jet engine. Manufactured by Associated Research, Inc., the bench type instrument has a variable output from 0 to 30kv and is rated at 1 kva.

Apron Sealer

Surface protection of airport aprons can be provided by an application of Koppers coal-tar pavement sealer. The sealer acts as a shield between spilled aircraft fuel and asphalt. It is impervious to petroleum derivatives and also protects the aprons from harmful effects of sunlight, water, salt, frost and dehydration.

Surge Suppressor

Parker Aircraft Co. has advertised a new line of lightweight surge suppressors for mobile aircraft refueling equipment. The cylindrical, piston-style suppressor is made of high strength aluminum alloy and reduces weight 60 to 70% over bladder-style units.

Transistor Switching

A transistorized switching unit to replace the vibrator used in original equipment has been developed by the Marconi Co. for use in its AD 7092 series of airborne direction finders. The company also reports that an AC power unit is available as a replacement for the existing rotary transformer. More than 3500 ADFs are presently in use throughout the world in a variety of aircraft.

FIRE PROTECTION and crash rescue is provided by "Little Squirt" jet-powered fire boat developed by Safety Jets, Inc., Dallas.

Thrustmeter

A thrustmeter for jet engines which functions from exhaust nozzle pressure is available from Schaevitz Engineering. The unit consists of a computer, a panel

SILICONE NEWS from Dow Corning

Photo courtesy Fairchild Engine & Airplane Corporation

Seals Where Others Failed

Fairchild recently supplied several F-27B's to Northern Consolidated Airlines, which serves Alaska and Canada. Trouble started when temperatures dropped below −50 F. Seals caused doors to stick closed. After the doors were opened, seals were so hard the doors couldn't be closed. Silastic®, the Dow Corning silicone rubber, was used to replace the seals for the large cargo and passenger doors. Results: no sticking closed, no jamming open . . . Silastic maintains a positive seal at all altitudes despite the wide variations in temperatures encountered.

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indicator and a pressure rake for installation at the exhaust nozzle. Total weight, excluding cables or pressure lines, is under 12 lbs. Electrical power required is 30 watts, 400 cps, 115 v.

Verti-Stands

Developed by Lockheed's Special Products (Atlanta) is an aerial workstand which can place maintenance workers in position 41 ft. above the ground in 90 seconds. The stand functions like a jack-knife, is built of tubular steel and has a capacity of 500 lbs. The stand requires power from 90 psi compressed air. Work basket area is 108 by 26 in. Dual controls are provided in the basket as well as on the ground.

Verti-Stands have been purchased by Northeast Airlines for maintenance on Convair 880s in Boston, New York and Miami.

Lightweight VOR

Collins Radio Co. has unveiled a lightweight 344D-2 VOR instrumentation unit for instrument landing systems. The 344D-2 provides VOR and localizer indication, to-from information, reciprocal bearing, left-right VOR, VOR course selection, glideslope needle and warning flags.

The unit is heavily transistorized, resulting in a weight of 2.6 lbs. It is housed in a standard 3-in. instrument case. Available from stock, the list price is $1185.

INFO FOR THE ASKING

Gas booster compressors—A 24-page catalog (No. M1) illustrates and describes line of oil-free gas booster compressors capable of boosting bottled gas to pressures of 15,000 psig. Booklet contains detailed performance and application information and recommendations for installation to meet specific operations.

Airborne recorders—United Data Control has published a bulletin describing commercial airline recorders which discusses recorder applications for continuous monitoring of instruments for accident analysis, airworthiness and maintenance. Information is based on data supplied FAA Bureau of Flight Standards conference on airborne recorders held recently in Atlantic City.

Disposable paper pillowcases—Information sheet from Acme Paper Products Co. describes economy of paper pillowcases which are designed to feel like cloth. Another sheet describes disposable paper earphone covers.

Nav supplies—Forty-eight-page catalog of navigation charts, clocks, computers and other instruments for aeronautical and marine use is available from Pan American Navigation Service.

Ground power—Booklet entitled *Ground Power Equipment for the Jet-Age* illustrates complete line of 400-cycle equipment for ramp operations available from Motor Generator Co.

Executive jet engine—Bulletin GED-4451.1 describes and illustrates capabilities of executive jet aircraft equipped with General Electric CJ610 engines. Bulletin emphasizes maintenance, available service facilities and discusses in-flight experience with the basic J85 engine.

Automatic announcements—Details of the Westrex automatic announcing system are presented in an illustrated, six-page bulletin. The Westrex system creates voice announcements by combining pre-recorded segments automatically when appropriate numbers are dialed from central or remote locations. The system is explained in Bulletin 3.8.

Snow plow waxes—Brochure on snow plow waxes which increase efficiency and prevent rust is available from Gledhill Road Machinery Co.

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EN ROUTE

By WAYNE W. PARRISH

A Game Hunt By Air . . . 90-Minutes of Thrills

W. L. G. Butt, Central African Airways manager for South Africa, snapped in his office in Johannesburg.

Wild game living in their primitive habitat in Africa are a never-ending fascination to most people. They certainly are to me. I've never had a yen to shoot wild game, but on the course of a number of trips in various parts of Africa I've had some fine opportunities to see game both from the ground and from the air.

Despite the steady reduction in numbers of wild life on that continent, there is still a great deal of it left in quite a few areas. It is pretty easy to see by car from several points served by trunk air services, but the finest experience I've had yet took place last November on the trip to Livingstone to see Victoria Falls.

There is a local operator there called Victoria Falls Airways which operates from a strip at Victoria Falls, Southern Rhodesia, across the river from Livingstone, Northern Rhodesia, which has an airline airport. This outfit is the only holder of an Air Transport License specifically authorizing flights over Victoria Falls and wild game viewing flights. It has a fine record, and it will fly you just about anywhere in Central or Southern Africa.

After 17 years, a Rapide

You young people probably have never heard of the de Havilland Rapide, an old reliable British bi-plane powered with two Gypsy Queen engines, but believe it or not, Victoria Falls Airways has three of these souvenirs of the aviation era of the 1930's. The last time I flew in a Rapide was in the Fiji Islands in 1944 during World War II and I had no idea there were any left in service. But just so you won't think Victoria Falls Airways too old-fashioned, it has a Piper Tri-Pacer on hand for charter use, too. The Rapide can carry six passengers.

But the old-fashioned, slow Rapide is a wonderful airplane for hunting game by air. I don't mean to shoot game, but to go out over the plains in search of herds. To my pilot, Pat Weir, I am indebted for a real thrill for flying me as low as 25 feet over the treetops and low over many miles of the Zambezi in a dawn excursion westward from Victoria Falls.

Early start, fine trip

You have to get up at dawn, and have early tea, get into a station wagon and drive to the airstrip. In an hour and a half you've had as fine a trip as the airplane can provide. This is one tourist trip that absolutely guarantees that you'll see plenty of wild game and you cover something like 200 miles of wild, primitive country. The cost is low, depending on the number of people taking the flight, but in any case it doesn't amount to more than $15 per person.

That morning last November we flew over, and circled around, big herds of elephants, zebra, and so many other types of wild game that I lost count. In the river were hippos and crocodiles. There are no giraffes in this area, but there are lions which only occasionally can be spotted from the air.

The wild country is beautiful. The big Zambezi is lazy as it wanders through grass and scrub country toward Victoria Falls. There are primitive native villages to be seen, isolated from the stream of civilization as they have been for many centuries. There are no roads, just paths linking native huts. The natives, of course, live largely off the land and if they go for supplies they have to travel for days in dugout canoes or boats.

The pilots, of course, have to be pretty good navigators as well as game spotters, but the river itself is the main point of reference and they never fly more than twenty or thirty miles on either side.

It's quite an international flight, too. The general route goes over parts of Northern and Southern Rhodesia, Bechuanaland, and the Caprivi Strip, the latter being a strange sort of no-man's land which technically belongs to Southwest Africa, a mandate of the Union of South Africa, but which is so inaccessible that it is actually controlled by no one.

On the way back to the airstrip the old Rapide swings over Victoria Falls for some awesome low-level views. And when you land back at the airstrip you are given a very attractive certificate, dated and signed by the pilot, certifying that you have flown over the game country by permission of Mosi-Ao-Tunya, "The Smoke That Thunders", the Monarch of the Zambezi. After that comes a good hearty breakfast at the Victoria Falls Hotel.

Go ye and do likewise.

As a matter of fact, the Rhodesias and Nyasaland have done a great job of creating game reserves where you can drive around leisurely, live in protected huts, camp out if you wish, and see all the wild life you can think of. There is a big new Luangwa Valley park with roads and camps, the new 8,650-square mile Fafue park, the Wankie National park, and the vast area around the huge Kariba Dam and lake recently opened. Write to the Rhodesia & Nyasaland Tourist Board, P.O. Box 8052, Causeway, Salisbury, Southern Rhodesia, Africa, if your travel agent isn't up to date. ■

The Zambezi River in the wild game country, snapped from the deH Rapide.

Photos by WWP.

Big ditch of Victoria Falls, snapped from the deH Rapide.

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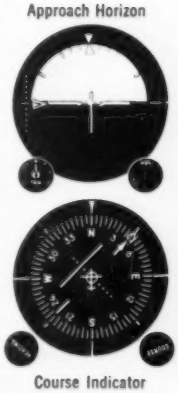

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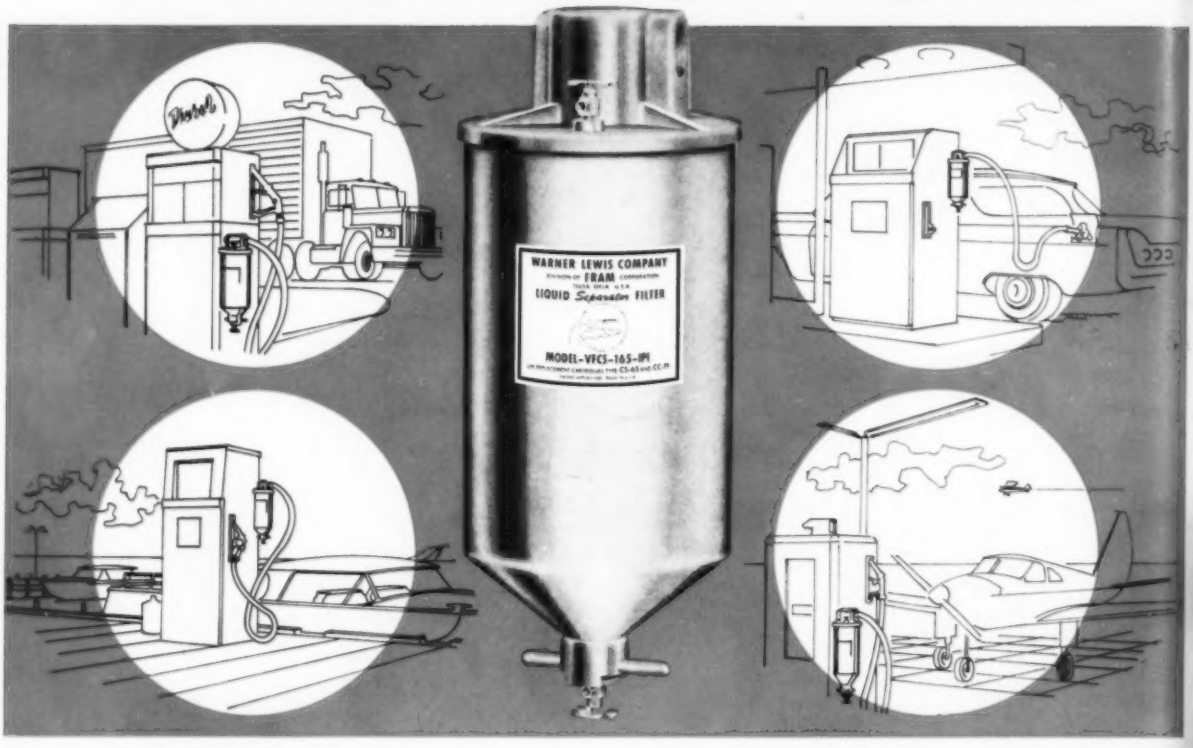

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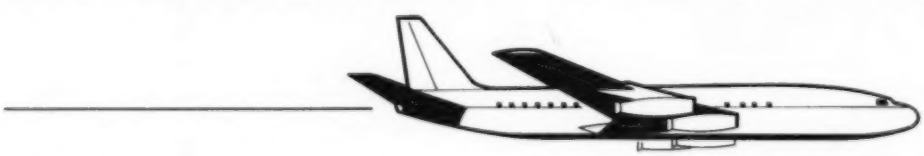

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